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A REPORT

... ON THE ...

Epidemic of Influenza in Chicago Occurring During the Fall of 1918

Reprinted from the Octennial Report
Department of Health
City of Chicago
1911-1918

JOHN DILL ROBERTSON, M. D.
Commissioner of Health

Reprint Series No. 2
1919

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Report of an Epidemic of Influenza in Chicago Occurring During the Fall of 1918.†*

The pandemic of influenza which swept across the United States in the fall of 1918 first manifested itself in the death rate of Chicago on September 21, 1918. From that day on it rapidly increased in this city for a period of 26 days until October 17, when it reached its maximum both in the number of deaths from influenza, pneumonia and all causes and in the number of new cases reported. On that day the total number of deaths from influenza and pneumonia combined was 381; the total deaths from all causes 520, and the total number of new cases of influenza and pneumonia reported was 2395. This was at the beginning of the fifth week of the disease. The death rate during this week was 63.0 per 1000 on an annual basis.

Following this the disease declined rapidly for a period of 15 days until November 1, on which day the deaths from influenza and pneumonia, combined, totaled 161. During the following two weeks the number of deaths from these causes combined continued to decline, falling to 32 daily on November 16. During the week ending November 23, the total death rate per annum, from all causes, again reached 16 per 1000 of population.

The total number of deaths from influenza and pneumonia during the eight weeks of the outbreak was 8510. The increment in the deaths from all causes over the average for the same period during the previous three years was 7103 or 99.2 per cent.

From September 21 to November 16, 37,921 cases of influenza and 13,109 cases of pneumonia were reported or a total of 51,030 for the two combined.

TIME RELATION OF THE CHICAGO OUTBREAK.

With a view of noting the rapidity with which the epidemic of influenza spread in this country it is interesting to study the onset of the Chicago outbreak in relation to the occurrence of the disease elsewhere in the United States.

Relation to Disease in the East. August 28, 1918, is given by Lieut. Keegan¹ as the onset of the influenza outbreak in the

1 J. A. M. A., Vol. 71, No. 13, pg. 1051.

*This article is here reprinted from type set when this report was first published in December, 1918, and hence the style differs somewhat from other portions of this volume.

†For a list of collaborators see preceding Introductory Chapter.

First Naval District where the disease was first recognized in the U. S. Naval Hospital at Chelsea, Mass. Between August 28 and September 11 more than 2,000 cases were reported from this district.

The U. S. Census Bureau's Weekly Reports on Mortality show the first manifestations of the disease in the weekly death rates in eastern cities, as follows:

Table I.

WEEK OF ONSET OF INFLUENZA EPIDEMIC IN EASTERN CITIES.

City	Week Ending		City	Week Ending		
	September			Sept.	October	
	21	28		28	5	12
Boston	33.3		Philadelphia	17.6		
Cambridge	18.7		Pittsburg	17.9		
Fall River	20.1		Providence	18.3		
New Haven	17.8		Syracuse	25.0		
Baltimore		17.0	Washington	20.1		
Buffalo		15.9	Newark		18.3	
Jersey City		16.3	New York		16.3	
Lowell		27.4	Rochester			21.7

In Other Sections of the United States. The rapidity with which the disease spread from the eastern seaboard is illustrated by the following table showing the week of onset for the disease in various other cities as indicated by the first rise in the weekly mortality rates reported in the U. S. Census Bureau's weekly reports of mortality.

Table II.

WEEK OF ONSET OF INFLUENZA EPIDEMIC IN OTHER SECTIONS OF THE UNITED STATES.

City	Week Ending			City	Week Ending	
	Sept.	October			October	
	28	5	12			12
Memphis	19.9			Dayton		24.3
Nashville	18.1			Denver		21.2
New Orleans	16.6			Louisville		36.8
Atlanta		21.5		Milwaukee		19.7
Chicago		20.8		Minneapolis		17.5
Indianapolis		19.7		Omaha		27.3
Kansas City, Mo.		18.8		St. Louis		15.9
Richmond		19.1		St. Paul		19.0
Cincinnati			24.4	Seattle		17.9
Columbus			23.7			

Army and Navy Camps in Vicinity of Chicago. In the vicinity of Chicago an extensive influenza outbreak started on September 8 at the Great Lakes Naval Training Station, which is located 32 miles north of the city. This was 13 days before the onset of the outbreak in Chicago.

Camp Grant, located at Rockford, 92 miles northwest of the city, also suffered from a severe influenza-like disease, which Hirsch and McKinney² reported as starting on September 21. During the week ending October 4, the Surgeon-General's report of Disease Conditions Among Troops in the United States shows an annual admission rate of 10,404.3 for this cantonment. This was the week of greatest incidence and was followed by a rate of 2,644.4 in the subsequent week.

Occurrence in Chicago Suburbs. Replies received in answer to a questionnaire sent to health officers in cities and towns surrounding Chicago show the following dates of onset and greatest incidence of influenza outbreaks in neighboring suburbs and cities.:

Table III.

DATE OF ONSET OF INFLUENZA EPIDEMIC IN NEIGHBORING
SUBURBS AND CITIES.

North of Chicago	Date of Onset	Reached Maximum
Winnetka	September 9	October 4
Glencoe	" 10	" 1
Lake Forest	" 20	" 15
Evanston	" 23	" 1
West of Chicago		
Berwyn	September 10	" 15
Hinsdale	" 15	" 20
Western Springs	" 22	" 28
Wheaton	" 24	" 15
LaGrange	" 27	" 17
Oak Park	" 27	" 25
Glen Ellyn	" 30	" 18
Desplaines	October	
South of Chicago		
Harvey	October 3	" 20
Joliet	" 4	" 20
Chicago Heights	" 10	" 25
Blue Island	" 14	" 19

Previous Influenza Epidemic in Chicago. In January, 1890, Chicago was reached by the pandemic of influenza which was then encircling the globe. This epidemic, like the present outbreak, spread from the East to the West, following the lines of travel. Swayne Wickersham, commissioner of health, in the annual report of the Department of Health, 1890, describes the local outbreak as follows:

"It had crossed the Atlantic and invaded our eastern seaboard cities. Isolated cases were then existing in all parts of our city, which in a few days developed into a full-blown epidemic. It reached its height in our city the last week of January, at which time my belief is that over one hundred thou-

2) J. A. M. A.—Vol. 71,—No. 21, pg. 1735.

sand of our citizens were sufferers from that cause alone. There are no records to show that it ever before prevailed in an epidemic form in our city, although at several periods it had taken a severe hold of some of the cities and states of our country. It continued to prevail during February, March and April, but in a modified degree. I do not believe that any fresh cases occurred after the first of May. Its duration was about four months. The deaths directly attributed to it by the attending physicians, as shown by the certificates, were one hundred and twelve. But in a very large number of death certificates presented to this department for burial permits, it was prominently mentioned as a complicating cause. It undoubtedly hastened the death of a large number who were suffering from consumption, also those who contracted pneumonia and other diseases of the respiratory organs.

“The largest monthly mortality for the year was in January, which was two thousand five hundred and one.

“The heaviest mortality for any one week of the year occurred in the one ending January 25, which amounted to six hundred and ninety-four. The total mortality for the year was twenty-one thousand eight hundred and fifty-six. From May 1 to the end of the year no unusual sickness prevailed; during many weeks of that time our death rate was very low. Notwithstanding the high death rate during the first quarter, the year terminated with a death rate per thousand of our population of but 18.22, which is remarkably low for a city of twelve hundred thousand.”

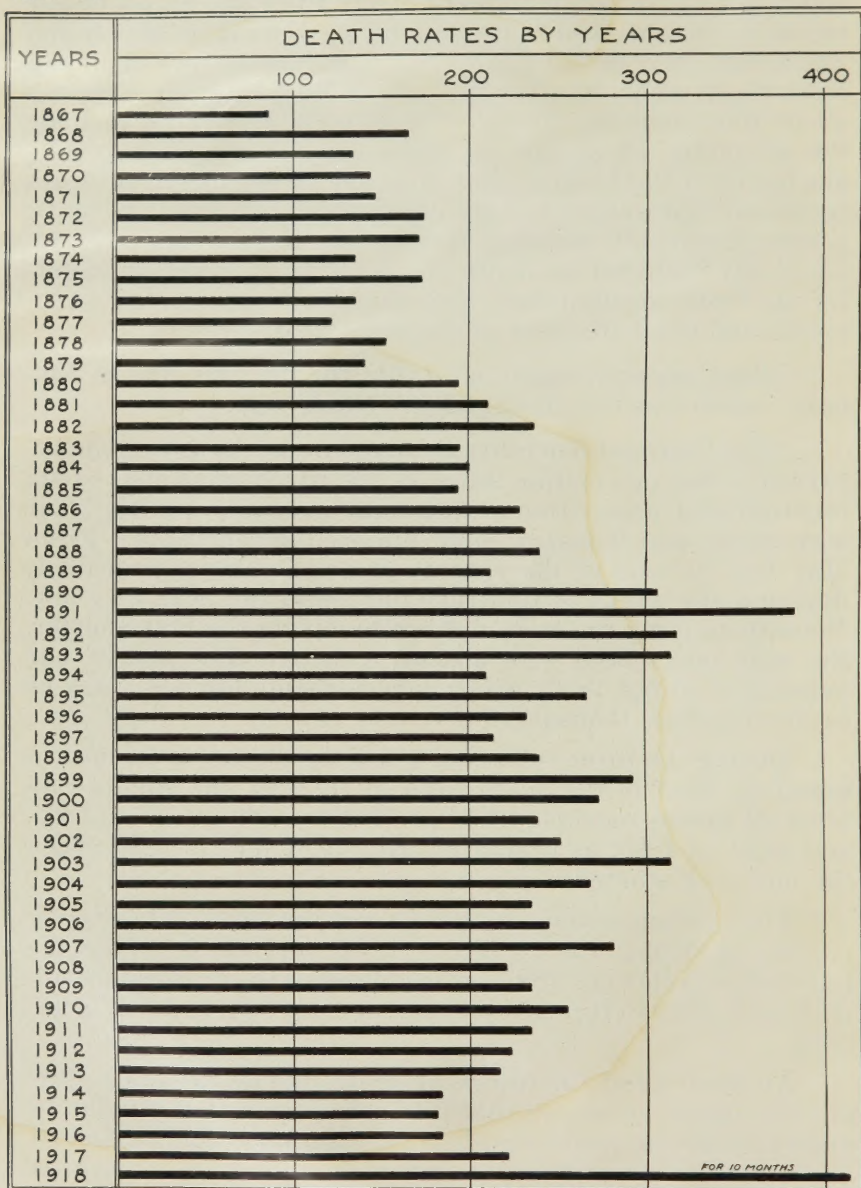
During the three following years the disease continued to manifest itself in the death rates of the city, the annual rate from all causes reaching 24.16 per 1,000 in 1891, 21.85 in 1892, and 21.61 in 1893, as compared with 19.87 during 1890, when the outbreak started.

The average annual death rate for the four years preceding the epidemic was 19.38 per 1,000, and 16.73 during the four years following 1893, as compared with an average annual rate of 21.87 for the epidemic period, 1890 to 1893, inclusive.

An analysis of the causes of death during the years 1890 to 1893, inclusive, shows that the increase was largely due to deaths from the acute respiratory diseases. The combined death rate from pneumonia, influenza and acute bronchitis was especially augmented in the four years, during which time the epidemic apparently continued.

The combined death rate from the respiratory diseases from year to year in Chicago is shown in Chart I.

1867-76	146.6
1877-86	187.9
1887-96	271.8
1897-06	257.4
1907-16	221.9



ANNUAL DEATH RATES PER 100,000 FROM PNEUMONIA, INFLUENZA & BRONCHITIS
IN CHICAGO

CHART I.

Unusual Prevalence of Pneumonia in Relation to Present Epidemic. Chart I also shows the sharp rise in the deaths from the acute respiratory diseases in the year 1917. This recent increase in the acute respiratory disease death rate is shown in greater detail in Chart II below, which shows the death rates from pneumonia, acute respiratory diseases, and all causes by months for the years 1916, 1917 and the first 10 months of 1918.

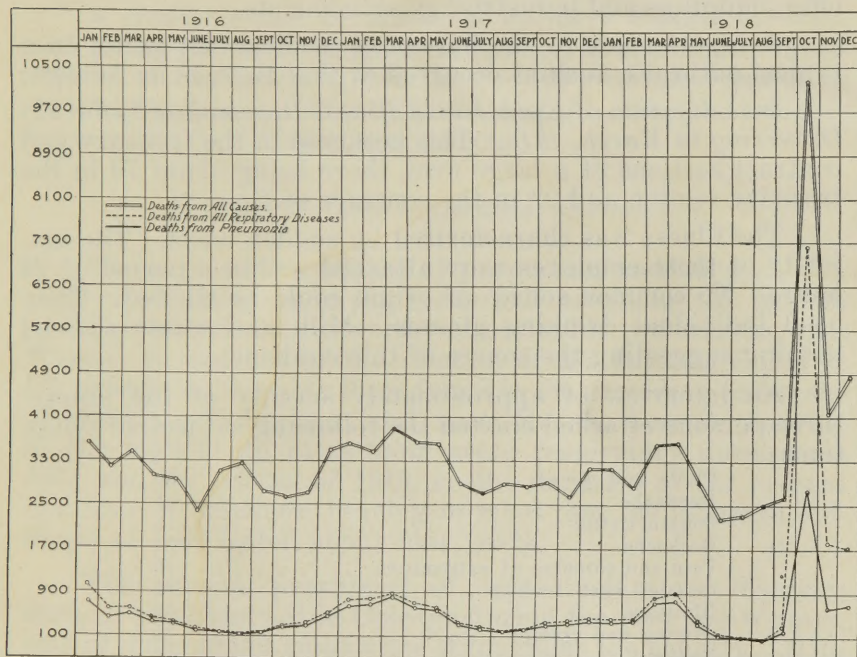


CHART II.

Deaths from Respiratory Diseases in Chicago During 1916, 1917 and 1918.

Pneumonia was unusually severe in Chicago in the winter of 1916 and 1917. The annual death rate, per 10,000, from this disease was 19.7 for the year (1917), 30.81 for the first five months and 36.19 during the month of March of the same year. During March and April, 1918, pneumonia was again unusually prevalent, the annual death rate for the two months being respectively 30.83 and 34.86 per 10,000.

Clinically the acute respiratory diseases occurring during the years just preceding the pandemic of influenza in the year 1918 oftentimes resembled influenza. Mathers³ was led

3) Jour. Inf. Dis.—Vol. 21, July, 1917, pg. 7.

to make a bacteriological investigation of the "influenza" occurring in the winter of 1916, but found influenza bacilli in only one of the 61 cases studied. He found the disease due principally to a virulent hemolytic streptococcus, which he found in the upper respiratory tract in 46, and in the blood in three of his series of cases.

In the month of March, 1918, numerous local outbreaks of acute respiratory diseases were brought to the attention of the health department. These occurred especially in large office buildings and industrial establishments.

A report made by the bureau of medical inspection on a typical outbreak, such as occurred at that time, is as follows:

Investigation of Epidemic of Illness Resembling Influenza Occurring in March, 1918. This occurred in the treasury and contract sections of a large firm, there being about 70 in the treasury section and 23 in the contract section.

The illness was characterized by sudden onset. The majority of these employes were attacked within a period of 24 hours. No common source of origin could be elicited. They used individual drinking glasses. Milk and water showed nothing suggesting the source of this epidemic.

An interview of approximately seventy of the ninety-three persons attacked elicited the following subjective symptoms:

Chills and fever	69
Headache	61
Conjunctivitis	15
Backache	51
Pain and soreness of extremities	40
General tired feeling	37
Dizziness	36
Griping and cramps	24
Nausea	38
Vomiting	13
Diarrhea	4
Constipation	5
Sore throat	38
Cough	39
Rhinitis	14
Tingling sensation of fingers	7
Metallic taste in mouth	4
Sulphur taste in mouth	2

Sixty-one of the reports were complete enough to permit the following tabulation of facts bearing upon the etiology:

No. eating at restaurants in neighborhood	47
No. bringing lunch from home	14
No. who ate white bread	35
No. who ate rye bread	19
No. who ate corn bread	1
No. who ate all wheat bread	11
No. who ate bran bread	5
No. who drank city water	67
No. who drank Hydrox water	27

It was interesting to note that all employes affected were office employes except three who came to the office for assignment and spent the rest of the day on the outside doing field work.

The bacteriologic examination of cultures and sputum failed to show the influenza bacillus present. The pneumococcus, group IV, was present in practically all of the cases studied bacteriologically.

A similar attack of illness of no more definite etiology, and giving the same symptom complex, was thoroughly investigated at two other establishments. One of these had 20 of 200 employes in the office attacked, and the other had a larger force with about 10 per cent. affected.

PNEUMONIA AND INFLUENZA ELSEWHERE.

The unusual prevalence of pneumonia and influenza-like respiratory diseases in the years just preceding the present epidemic of influenza is worthy of notice for two reasons, viz.: Firstly, on account of the relation of the bacteria found in the present epidemic to those found in the preceding outbreaks of respiratory diseases, and, secondly, the possible bearing of the high death rates from acute respiratory diseases in 1917 and the winter of 1918, on the duration of the present epidemic of influenza, bearing in mind that the influenza epidemic of 1890 lasted about four years.

The unusual prevalence of acute respiratory diseases, such as was observed in Chicago during the past two winters, was of widespread occurrence throughout the country. Military and naval training camps suffered severely and many cities reported outbreaks of "lagrippe" and severe pneumonia.

In New York City the health department called attention to these outbreaks in the weekly bulletins of January 27 and March 10, 1917, respectively, as follows:

"Figures compiled by the bureau of records indicate that grip, pneumonia and other respiratory diseases which were so alarmingly prevalent during the past five weeks are on the wane."

"Since the middle of January, New York has been suffering from the invasion of a peculiarly virulent form of pneumonia. Judging by the following figures showing the deaths from pneumonia, week by week, since the first of the year, there is little indication that the infection is abating."

Many other cities reported high death rates from pneumonia. The following is a list of such rates, taken from the reports of the respective departments of health.

Table IV.

HIGH PNEUMONIA DEATH RATES IN VARIOUS CITIES OF THE
UNITED STATES FOR YEARS 1916, 1917 AND WINTER OF 1918.
ANNUAL RATE PER 100,000 OF POPULATION.

City	1916	1917	4 months 1918 Rate per 100,000 Population
New York	188.61	192.61	157.47
Chicago	154.66	197.00	250.20
Philadelphia	182.16	221.77	363.46
St. Louis	178.65	219.48	
Boston	215.60	209.03	360.71
Cleveland	182.32	197.61	
Detroit	237.50	276.43	452.10
Baltimore	237.78	245.69	
Pittsburgh	339.33	357.73	757.11
Los Angeles	89.52	96.71	118.85

Colonel Vaughan and Captain Palmer, in a comprehensive report on Communicable Diseases in the National Guard and National Army of the United States, during the six months from September 29, 1917, to March 29, 1918,⁴ state that pneumonia was the cause of 61.5 per cent. of all deaths among troops during this period, and that the pneumonia death rate was twelve times greater in the army during the period covered by the report than in the Registration Area of the United States during 1915.

They state further that "pneumonia has been of more serious import than any other single disease. It has occurred in epidemic form in many camps, particularly in those occupied by southern troops."

The highest morbidity rates were observed at Camps Bowie, Wheeler, Travis, Pike and Cody.

In a comparison of the army death rate from pneumonia with the similar rates in civil life for the same period they show that the army rates were above those for civilian life. Pneumonia prevailed in the army most extensively during November and December, 1917. The epidemic nature of the disease in some camps is emphasized by the high weekly rates at certain periods. For example, Camp Bowie had an average annual death rate, per 1,000, from pneumonia of 96 for

4) Mil. Surg. Vol. 43, No. 3, Sept. 1918, pg. 251.

six months, and 468 for the week ending December 7, and Wheeler an average rate of 95 for the six-month period, and 340 for the week ending November 23.

The same authors⁵ in the aforesaid report state also that influenza-like bronchitis has prevailed widely in camp and that "a disease strongly resembling influenza became prevalent in the Oglethorpe camps about March 18, 1918. It soon assumed endemic proportions. Within two weeks every organization in Camp Forrest and the Reserve Officers' Training Camp was affected. It seems to have visited only a part of Camp Greenleaf. The war prison barracks were not invaded. After about three weeks the epidemic subsided rapidly. The number of cases sent to hospital or to quarters was 1,468 in a total strength of 28,586. Owing to the fact that many cases were not severe, the total number of officers and men attended cannot be given; an estimate based on replies to a circular letter of inquiry to the several organizations indicates that not less than 2,900 cases have occurred in Chickamauga Park.

"The attention of the Camp Surgeon's office was called to the existence of this disease on March 18, at which time the writer saw a number of men appear at sick call in the 51st Infantry, suffering from the disease, which the regimental surgeons were unable to diagnose. The symptoms were as follows: Headache, pain in the bones and muscles, especially the muscles of the back, marked prostration, fever (sometimes as high as 104°). Sometimes there are conjunctivitis, coryza, a rash and possibly nausea, recovery taking place in a few days.

"In most cases a definite diagnosis was not made at the regimental sick call, but at the receiving ward, and when a name was given, it was usually called influenza."

COURSE OF THE 1918 CHICAGO OUTBREAK.

The onset of the epidemic in Chicago was during the days just preceding September 21. A glance at Chart III shows that the first marked rise in the death rate from acute respiratory diseases occurred on the aforesaid date.

The daily number of deaths from acute respiratory diseases and all causes occurring during the two weeks' period preceding September 21 and for the same period in 1917 was as follows:

5) Mil. Surg.—Vol. 43, No. 4, Oct. 1918, pg. 392.

Table V.

NUMBER OF DEATHS DAILY DURING TWO WEEKS PRECEDING
SEPTEMBER 21, 1918, AND THE CORRESPONDING
WEEK OF 1917.

Date Sept.	Pneumonia		Influenza		Acute Bronch.		All Causes	
	1917	1918	1917	1918	1917	1918	1917	1918
8	9	3	0	0	1	1	144	115
9	4	3	0	0	0	0	90	101
10	4	2	0	0	0	0	92	70
11	3	2	0	0	0	0	92	65
12	7	1	0	0	1	0	94	71
13	10	1	0	1	1	0	114	76
14	2	3	0	0	0	0	40	40
15	19	3	0	0	2	1	169	117
16	8	7	0	0	0	0	116	106
17	4	5	0	0	0	0	99	80
18	10	1	1	0	0	0	72	71
19	9	2	0	0	1	1	88	68
20	6	4	0	0	0	1	87	100
21	4	2	0	0	0	0	40	30
Totals	99	39	1	1	6	4	1337	1119

These figures show that practically no changes in the death rate occurred prior to the date heretofore given as the date of onset of the epidemic in Chicago.

Influenza was not a reportable disease prior to this date, but pneumonia has been reportable since the early part of 1910. The number of cases of pneumonia reported daily before and at the time of the onset of the epidemic ran, as follows:

Table VI.

NUMBER OF CASES OF PNEUMONIA REPORTED DAILY FROM SEPTEMBER 15 TO SEPTEMBER 25, 1918.

Date	Number	Date	Number
Sept. 15	2	Sept. 21	19
" 16	2	" 22	4
" 17	9	" 23	4
" 18	11	" 24	0
" 19	7	" 25	55
" 20	1		

Daily Death Rate from Influenza. The number of deaths occurring daily from acute respiratory diseases noted in connection with the number of deaths from all causes is the best available index of the course of the disease in the city. The following chart, No. III, shows the number of such deaths by days for the period from September 19 to December 1, inclusive:

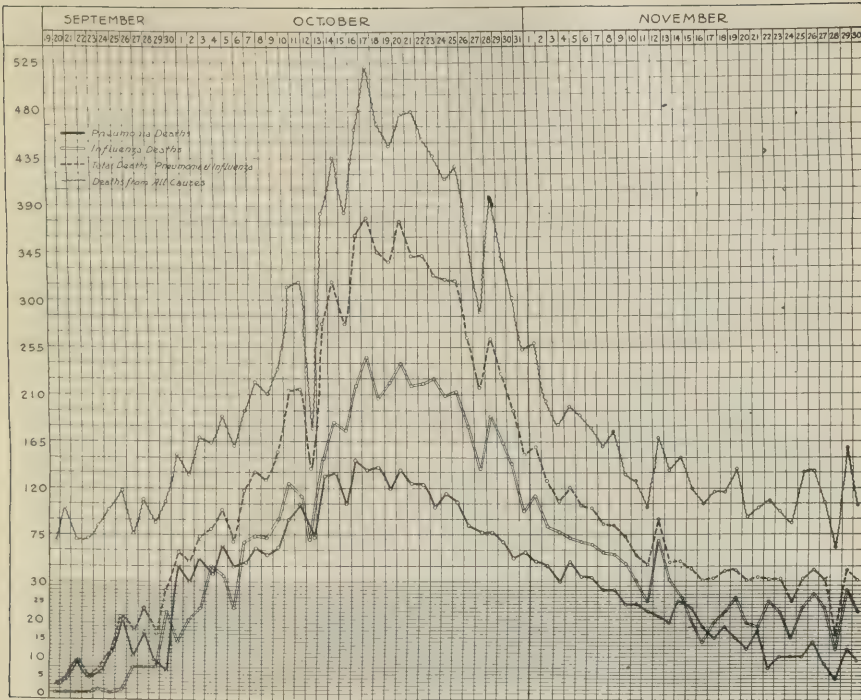


CHART III.

Daily Deaths from Acute Respiratory Diseases and All Causes in Chicago
During Epidemic of Influenza in 1918.

Figured by weeks the death rate ran, as follows:

Table VII.

WEEKLY DEATH RATES FROM INFLUENZA, PNEUMONIA, ALL
CAUSES IN CHICAGO AND WEEKLY EXCESS.

RATE PER 1000 POPULATION.

Week ending	9/28/18	10/5/18	10/12/18	10/19/18	10/26/18	11/2/18	11/9/18	11/16/18
Influenza	0.34	3.43	11.46	24.93	30.94	20.36	9.80	4.72
Pneumonia	1.48	4.94	9.55	17.33	16.62	9.16	5.02	3.11
Both	1.82	8.37	21.01	42.26	47.56	29.42	14.82	7.83
Percentage of all deaths due to influenza and pneumonia ...	14.6	41.1	63.5	73.4	75.5	67.1	56.4	42.3
All causes	12.5	20.3	33.1	57.6	63.0	44.0	26.3	18.5
Average corre- sponding week 1915-17	12.3	13.4	12.9	12.4	12.6	12.2	12.5	12.7
Excess in 1918..	0.2	6.9	20.2	45.2	50.4	31.8	13.8	5.8

The weekly increment represents the total increase in the number of deaths occurring in each week over the average number in the same weeks during the preceding three years.

The sum of the increments occurring in all the weeks of the epidemic is by some considered as the total number of deaths chargeable to the disease. This was 67 in excess of 8,510, the total number of deaths from influenza and pneumonia during the period.

Whether this excess represents causes of death wrongly diagnosed or acceleration of death in persons suffering from other diseases on account of a superimposed, unrecognized influenza infection, remains unsolved at this time.

Cases of Influenza and Pneumonia Reported Daily. The number of cases of influenza and pneumonia reported daily is not offered to show the total morbidity from these infections. It serves, however, as an additional index of the course of the disease. In this connection it is interesting to note that the

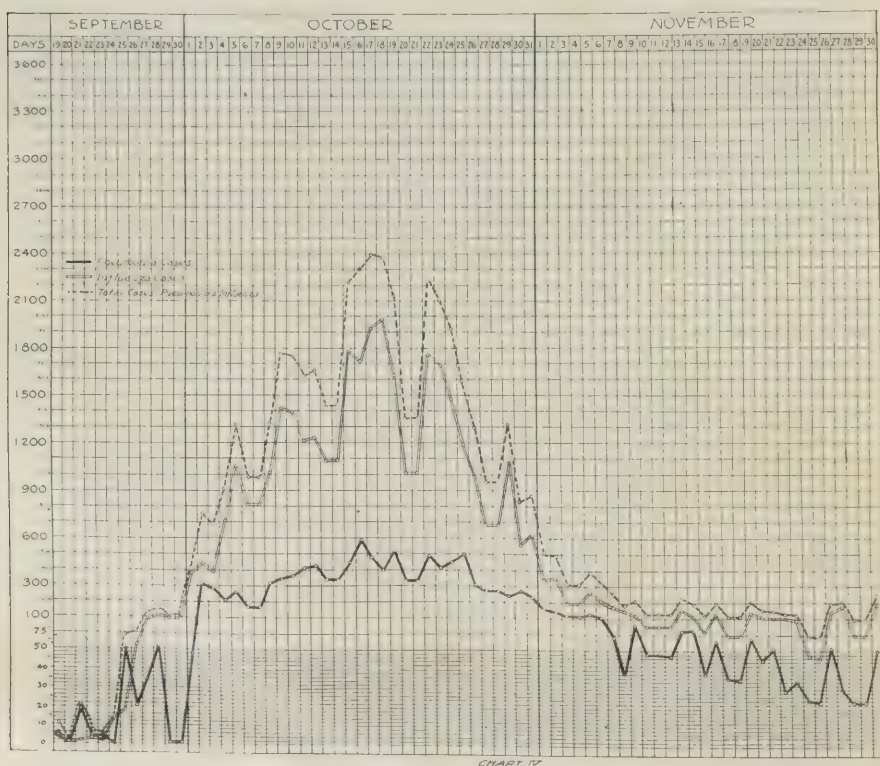


CHART IV.

Cases of Pneumonia and Influenza Reported in Chicago During the 1918 Influenza Outbreak.

greatest number of cases was reported on October 17, the day on which the greatest number of deaths occurred.

The curve of the number of cases reported daily, Chart IV, follows very closely the curve of the number of deaths reported, as may be seen by comparing the same with Chart III.

Influenza was first made a reportable disease with the advent of the present epidemic. This fact, together with the stress under which physicians labored during the epidemic, is the reason for the belief that the morbidity reports are not complete.

Other Morbidity Reports. In addition to the reports of cases by physicians the health department received reports of cases from dispensaries, hospitals, asylums and similar institutions. These have been included in the daily counts of cases as enumerated above.

Attendance at Schools. Surveys of the number of absentees in the public and parochial schools in the various sections of the city were made by the division of child hygiene.

Chart V shows the percentage of absentees in the schools observed each day in the north, west and south sides of the city.

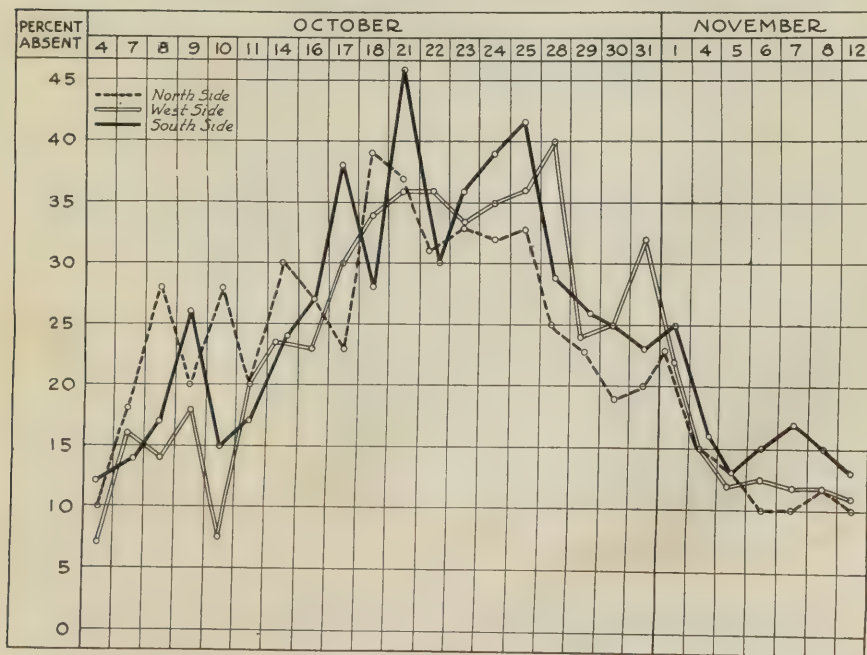


CHART V.

Percentage of Absentees in Schools During Influenza Epidemic, 1918.

The highest percentage of absentees occurred on approximately October 21, which was four days later than the date of the greatest incidence of the disease in the city. The survey clearly showed that the absence of pupils was only in part due to illness. Much of the absence was due to illness or death of other members of the family or the voluntary keeping of children from school by parents for fear of contracting the disease.

To what extent these various factors were responsible for the absence of pupils has not been determined. That a factor other than illness was largely responsible for non-attendance at school is probably corroborated by the uniform course of absence in the three sections of the city which does not correspond with the course of the disease through the city as shown by the table given under location of deaths.

Influenza in Industrial Establishments. With a view of obtaining an estimate of the occurrence of the disease in large industrial establishments and in the city as a whole, a questionnaire (see appendix A) was sent on October 31 to 53 large employers of labor in the city. Many of the replies received were not very satisfactory. A tabulation of the same shows October 22 as the day of greatest incidence of the disease in the 25 plants making satisfactory reports.

The following is a brief summary of other data gleaned from reports submitted by 20 business houses.

Table VIII.

SUMMARY OF ANSWERS TO QUESTIONNAIRE FROM TWENTY FIRMS
IN REGARD TO ILLNESS IN TWENTY INDUSTRIAL
ESTABLISHMENTS.

Total employes	37,209
Average number absent daily under normal conditions, about	1,031
Average number absent daily during the entire period of the epidemic, about	1,914
Average number of these absent daily on account of illness, about....	883
Average number of these absent daily, known to have influenza or pneumonia	297
Average deaths per day from influenza or pneumonia	182

Location of Deaths and Course of the Disease Through City. The following spot maps, Charts VI to XII inclusive, show the location of the deaths from influenza and pneumonia occurring each week.

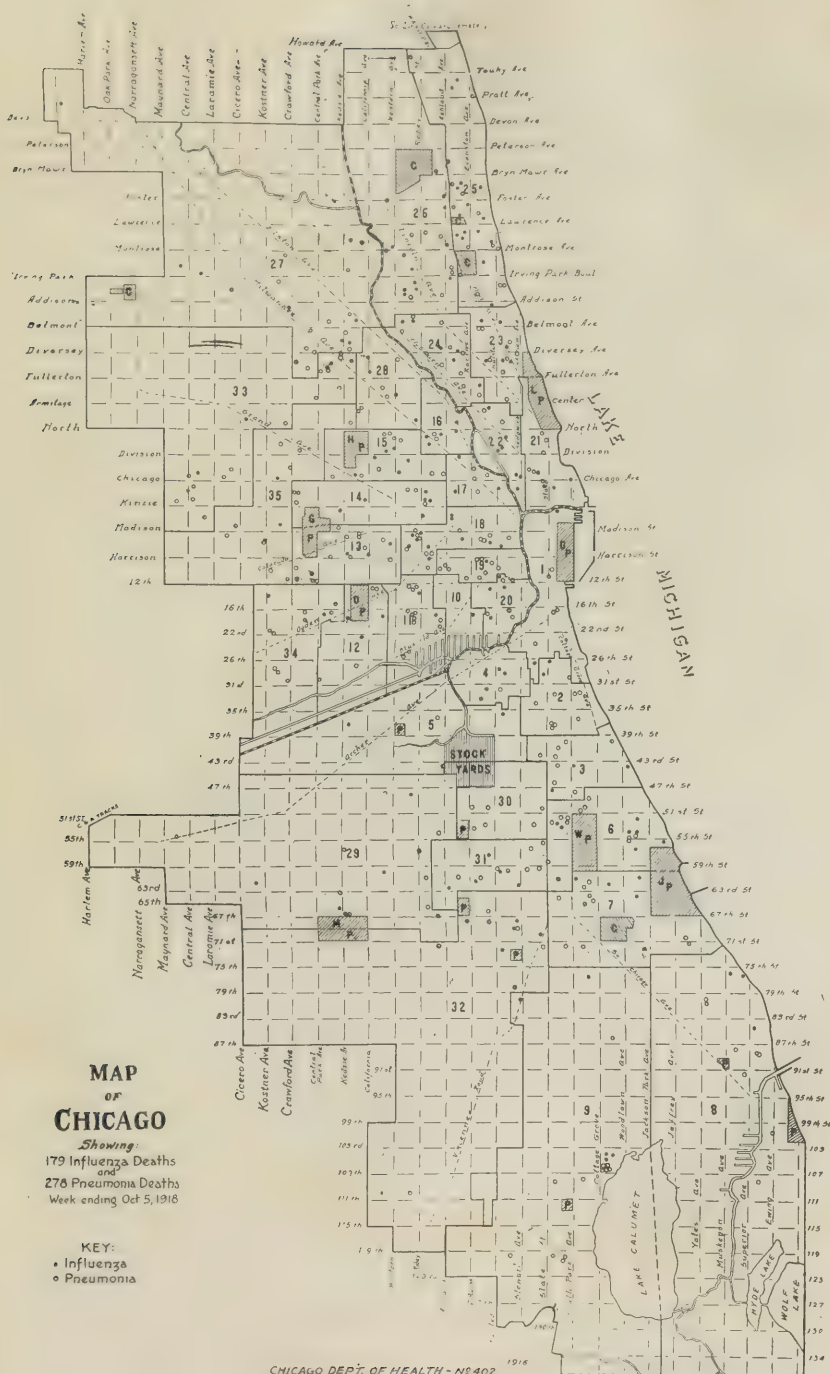


CHART VI.

SPECIAL REPORTS

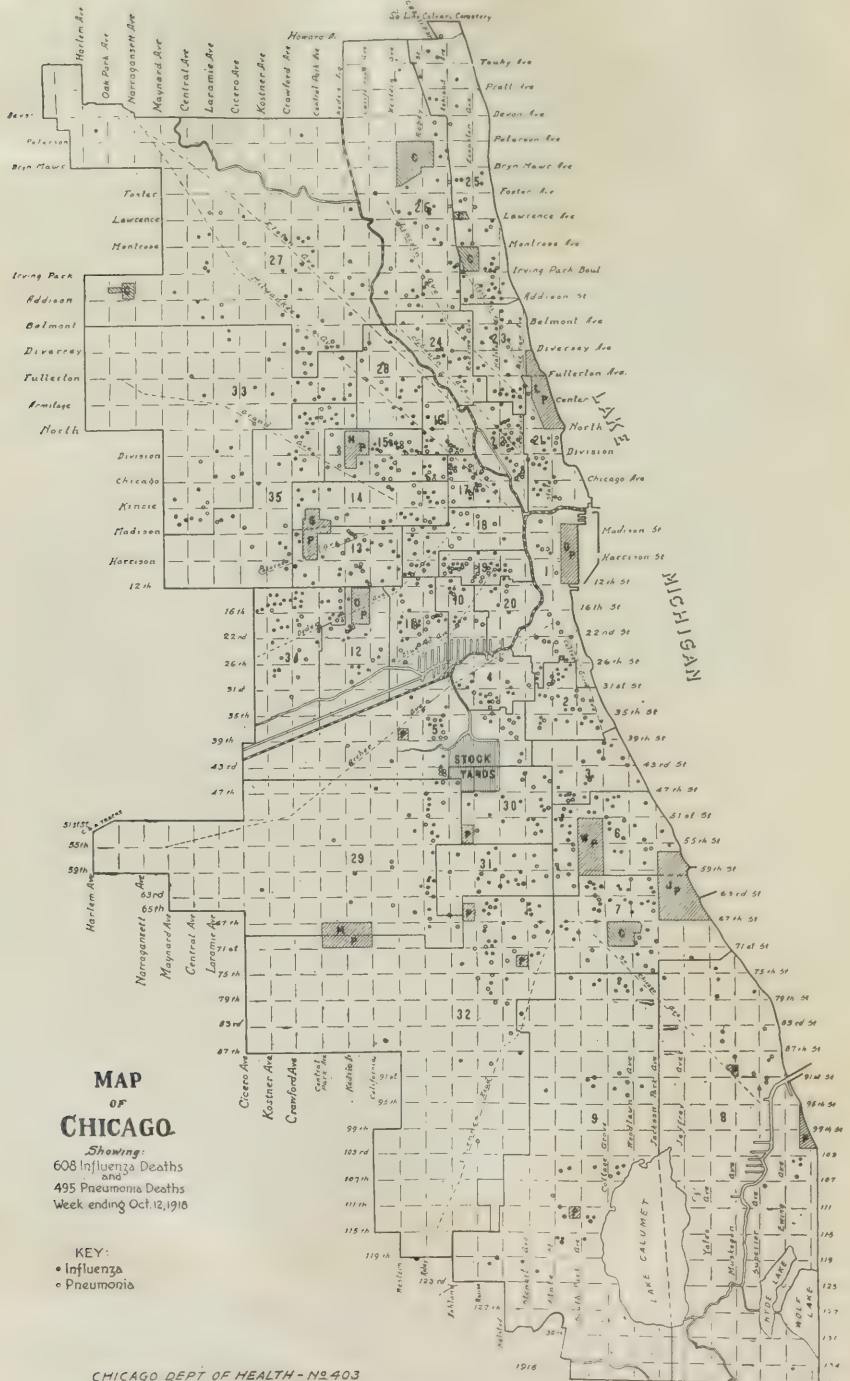
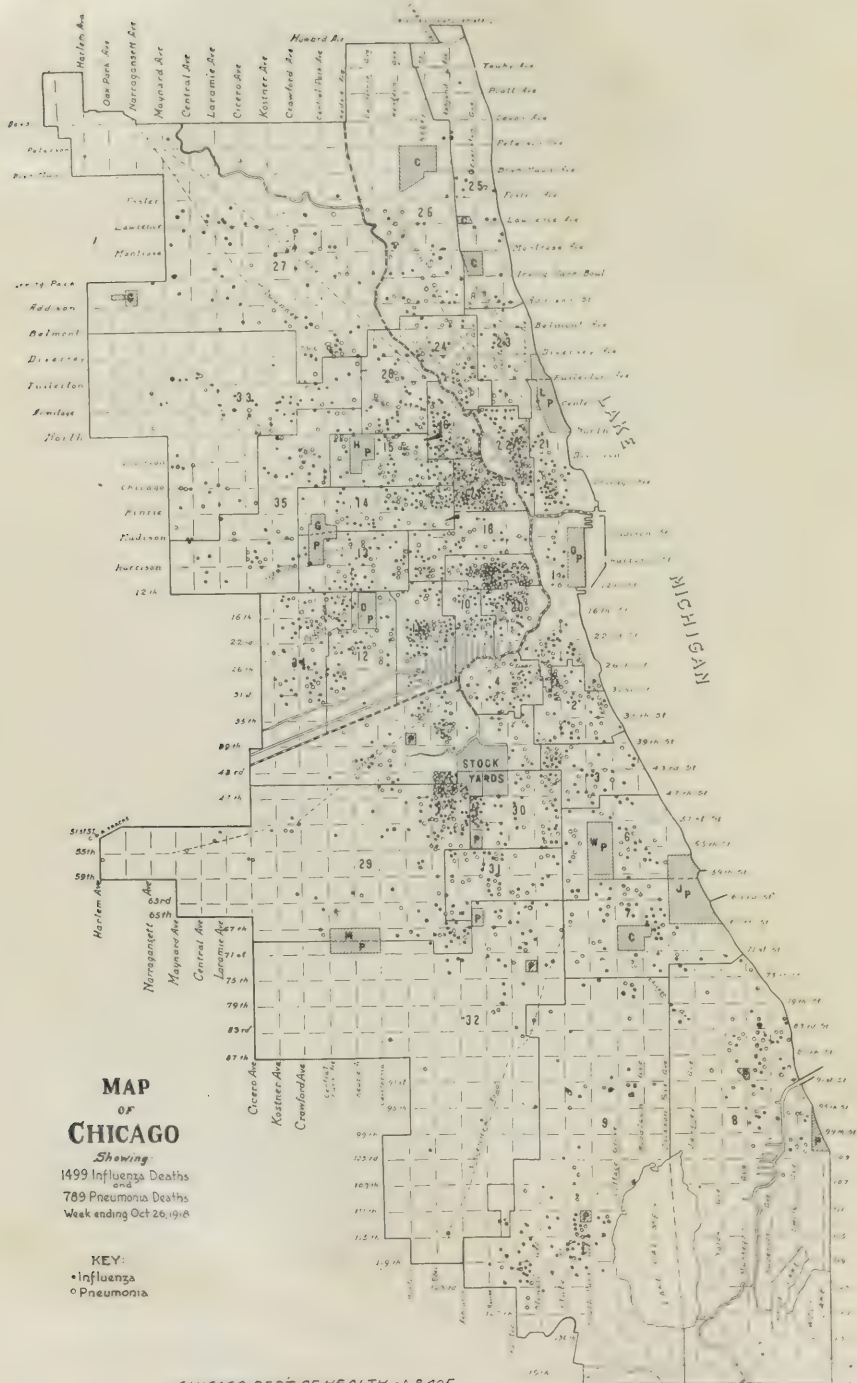
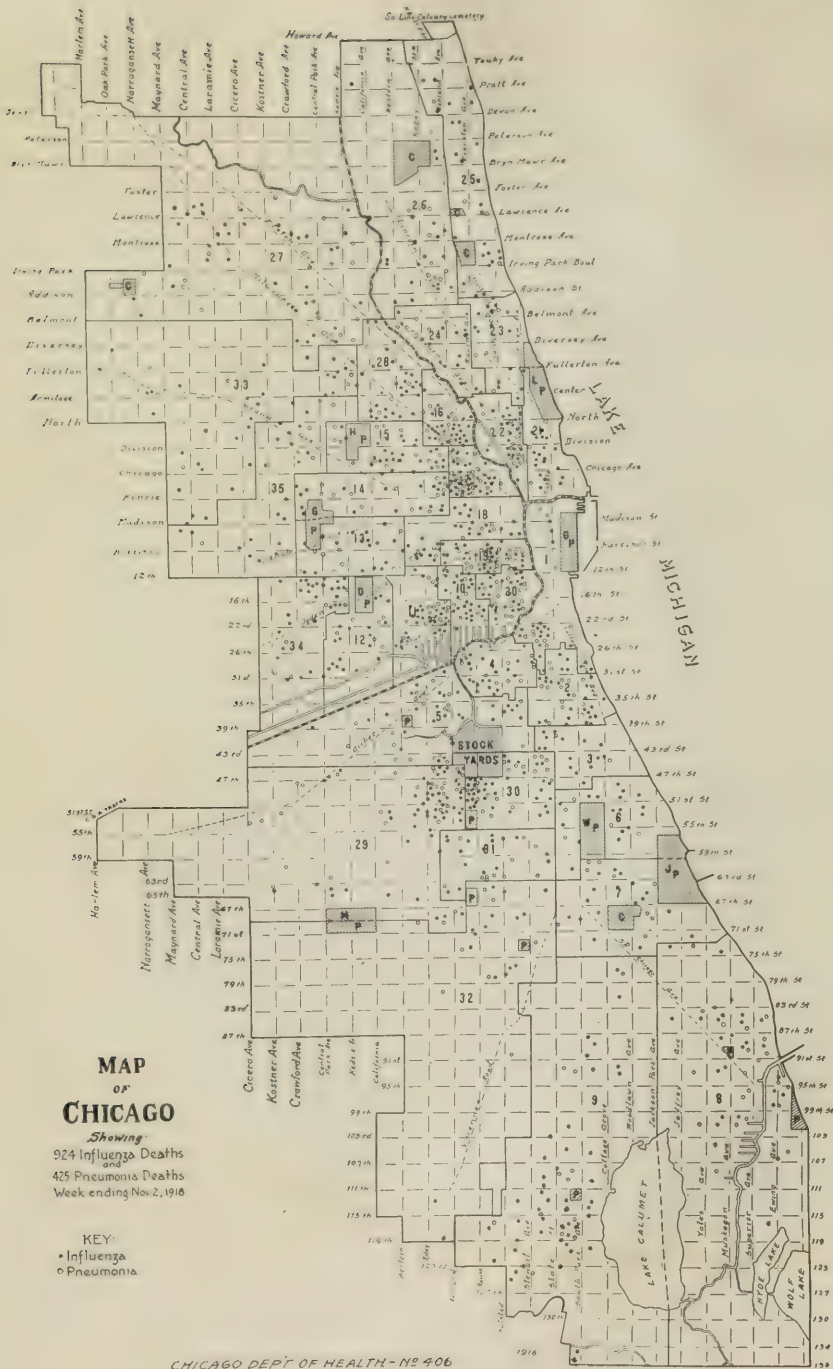




CHART VIII.





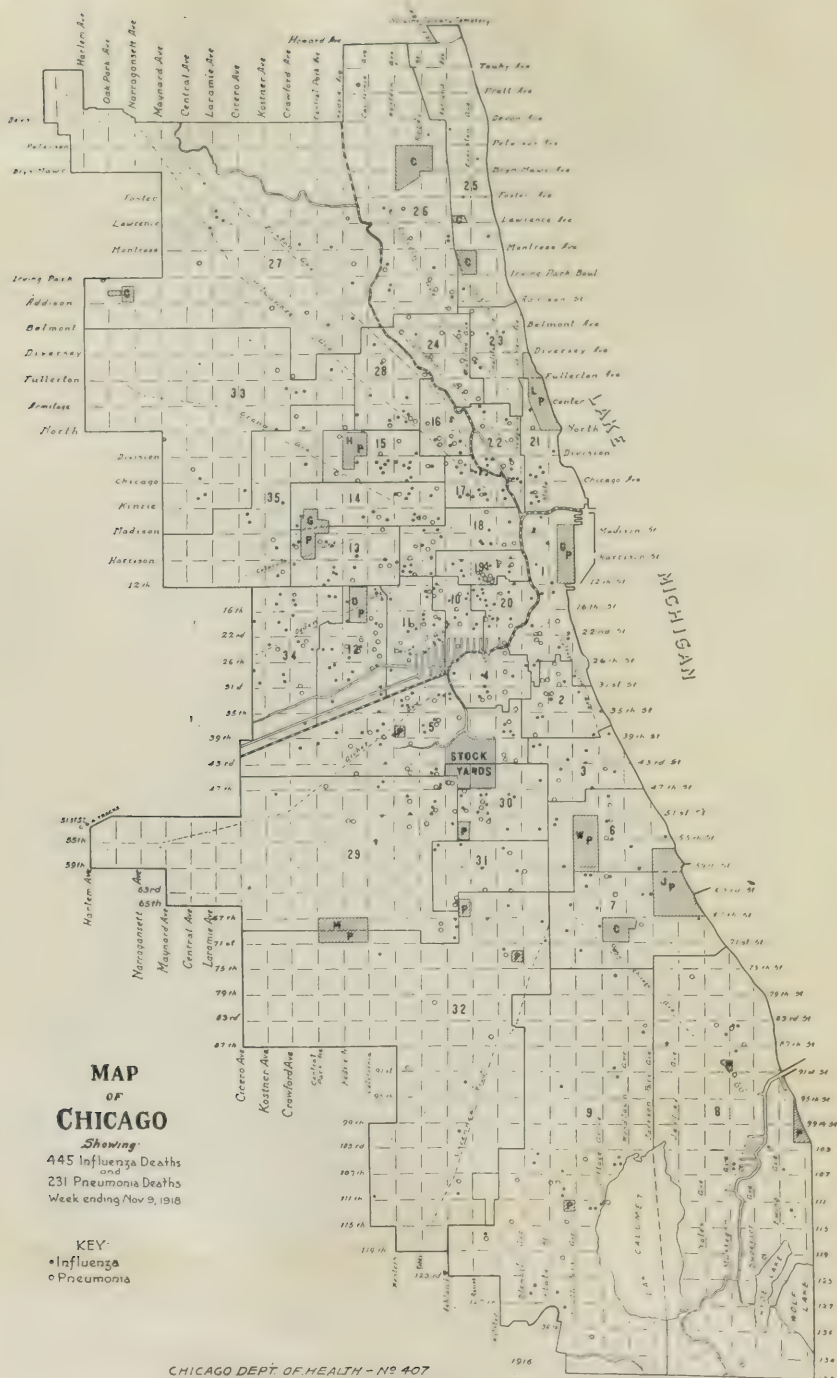
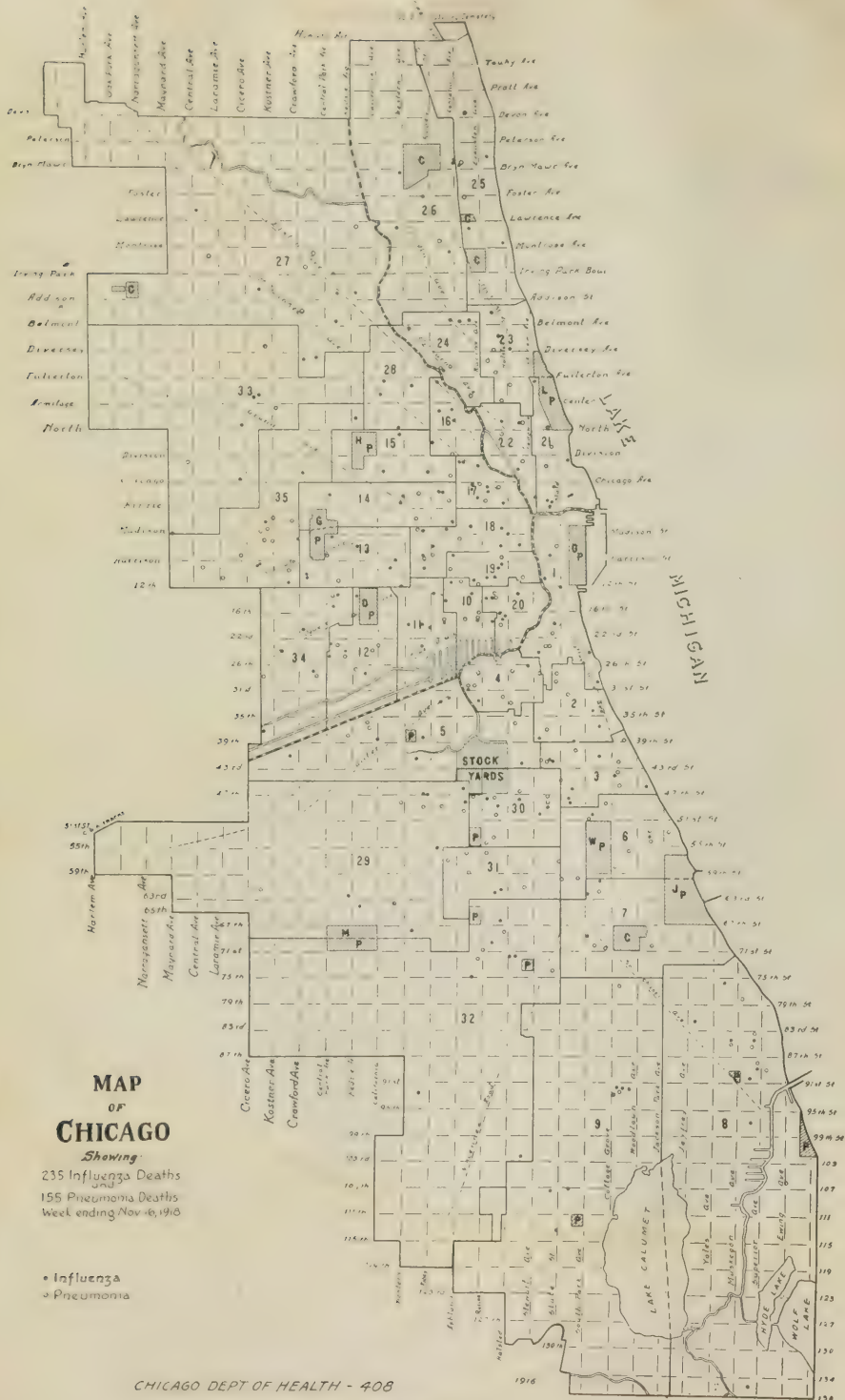


CHART XI.



The deaths from pneumonia are designated by a circle, while those reported as due to influenza are shown by dots.

In a study of these spot maps consideration should be given to the fact that the outlying parts of the city are more sparsely inhabited and that a line drawn along the line of 12th street divides the city evenly on a basis of population.

The misapprehensions due to difference in density of population are eliminated in the Table IX which shows the occurrence and progress of the disease in the city by geographical divisions, for which the population has been estimated by the U. S. Census method.

Location of Reported Cases. The location of the cases of influenza and pneumonia reported each week in the health officers' districts, grouped by the three geographical divisions of the city, namely, north, west and south sides, is shown in Table X.

By the foregoing data on the location of cases and deaths occurring weekly it is shown that the epidemic of influenza first affected the north side of the city. During the first three weeks of the outbreak the number of deaths occurring in the half of the city north of Twelfth Street each week exceeded the number occurring in the southern half.

The number of cases reported on the North Side were in excess of the number on the South Side only during the first and fifth weeks of the epidemic. In the fourth week of the disease the greatest relative number of deaths occurred on the West Side. In the fifth week the disease had spread to remaining sections of the West Side, occurring with greatest intensity on the southwest side.

Beginning with the fourth week the greatest incidence of the disease was in the half of the city south of 12th street. The last two weeks of the epidemic showed a marked preponderance of deaths in this section, while during the first two weeks the greatest death rate was north of 12th street. The estimated population of these two sections is practically the same and in each case represents about one-half of the entire population of the city.

During the eight weeks of the outbreak, 3941 deaths from influenza and pneumonia occurred in the northern half of the city as compared with 4257 in the southern half.

COMPARISON WITH COURSE ELSEWHERE.

Other Cities. For the purpose of comparison it should be borne in mind that the epidemic manifested itself in the death rate in Chicago on September 21, reached its climax on October 17, the 26th day of the disease, and that the greatest

Table IX.
DEATHS FROM INFLUENZA AND PNEUMONIA IN CHICAGO—DISTRIBUTION BY WARDS.

	Week ending 9/28/18 Infl. Pneu. Both			Week ending 10/5/18 Infl. Pneu. Both			Week ending 10/12/18 Infl. Pneu. Both			Week ending 10/19/18 Infl. Pneu. Both			Week ending 10/26/18 Infl. Pneu. Both			Week ending 11/2/18 Infl. Pneu. Both			Week ending 11/9/18 Infl. Pneu. Both			Week ending 11/16/18 Infl. Pneu. Both			Totals for 8 weeks Infl. Pneu. Both		
North Side (Wards 21, 22, 23, 24, 25 and 26)..... *Pop. 429,006	8	13	21	48	51	99	107	72	179	184	118	302	183	85	268	115	39	154	34	24	58	30	19	49	709	421	1130
West Side, North of 12th St. (Wards 13, 14, 15, 16, 17, 18, 19, 27, 28, 33 and 35) *Pop. 811,676	3	27	30	50	101	151	190	159	349	481	285	766	533	255	788	288	129	417	138	66	204	70	36	106	1753	1058	2811
Total North of 12th St	11	40	51	98	152	250	297	231	528	665	403	1068	716	340	1056	403	168	571	172	90	262	100	55	155	2462	1479	3941
*Total Pop. North of 12th St., 1,240,682																											
West Side, South of 12th St. (Wards 10, 11, 12, 20 and 34) *Pop. 330,555	0	13	13	10	31	41	70	49	119	189	104	293	202	93	295	126	50	176	75	33	108	27	17	44	699	390	1089
South Side and East of State Street (Wards 1, 2, 3, 4, 6, 7, 8 and 9).... *Pop. 535,026	6	10	16	31	66	97	123	107	230	262	171	433	298	187	485	186	93	279	91	48	139	41	45	86	1038	727	1765
Southwest Side (Wards 5, 29, 30, 31 and 32)..... *Pop. 391,459	1	14	15	13	35	48	75	82	157	207	174	381	264	144	408	135	82	217	72	48	120	29	28	57	796	607	1403
Total South of 12th...	7	37	44	54	132	186	268	238	506	658	449	1107	764	424	1188	447	225	672	238	129	367	97	90	187	2533	1724	4257
Grand total for city...	18	77	95	152	284	436	565	469	1034	1323	852	2175	1480	764	2244	850	393	1243	410	219	629	197	145	342	4995	3203	8198

Table X.

REPORTED CASES OF INFLUENZA AND PNEUMONIA IN CHICAGO—DISTRIBUTION BY WARDS.

[illegible]

mortality occurred in the fifth week of the disease, during which the annual rate per 1,000 from all causes was 63.0.

The following table shows the death rates in the various large cities of the United States during the week of greatest incidence, and also the total number of deaths attributable to influenza during the epidemic.

Table XI.

DEATH RATES DURING WEEKS OF HIGHEST INCIDENCE IN CITIES
OF THE UNITED STATES.

Week ended ...	Death Rates Per 1,000 Population Weeks of Maximum Death Rates				Nine Weeks Sept. 14 to Nov. 9	Excess of Deaths All Causes	Excess Per 1,000 Population
	Oct. 5	Oct. 19	Oct. 26	Nov. 2			
New York—							
Influenza			2971		10255	....	....
Pneumonia			2251		9102	....	....
All Causes			6783			20568	3.5
Death Rate			60.23				
Chicago—							
Influenza			1541		5045	....	....
Pneumonia			826		3230	....	....
All Causes			3137			8205	3.2
Death Rate			63.0				
Philadelphia—							
Influenza		2953			7842	....	....
Pneumonia		1644			4823	....	....
All Causes		5270				13055	7.4
Death Rate			156.01				
St. Louis—							
Influenza				170	642	....	....
Pneumonia				87	419	....	....
All Causes				426		815	1.0
Death Rate				28.48			
Boston—							
Influenza	282				3421	....	....
Pneumonia	225				934	....	....
All Causes	1476					4239	5.4
Death Rate	98.78						
Cleveland							
Influenza				529	1413	....	....
Pneumonia				153	485	....	....
All Causes				870		2018	2.8
Death Rates				63.98			
Detroit							
Influenza				297	903	....	....
Pneumonia				208	863	....	....
All Causes				669		1632	2.6
Death Rate				54.63			
Baltimore							
Influenza		564			1524	....	....
Pneumonia		793			2161	....	....
All Causes		1691				4022	6.7
Death Rate		147.03					
Pittsburgh							
Influenza				93	1032	....	....
Pneumonia				537	1376	....	....
All Causes				1132		3015	5.1
Death Rate				99.49			
Los Angeles							
Influenza				329	973	....	....
Pneumonia				53	241	....	....
All Causes				533		1171	2.1
Death Rates				49.23			

Deaths (except Detroit) as reported in U. S. Census Weekly.
Population midyear 1918 as estimated by U. S. Bureau of the Census.

The course of the disease, as manifesting itself in the weekly death rate from all causes in cities of various sections of the United States, is shown in Chart XIII below:

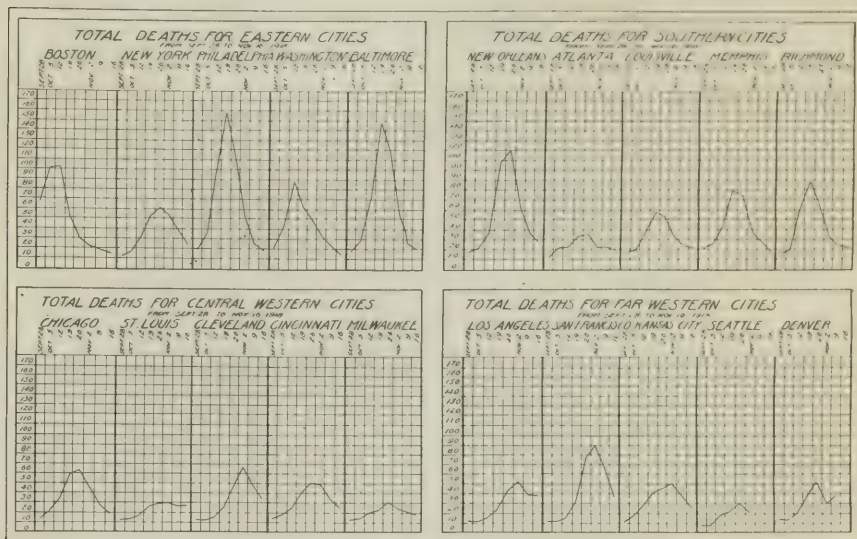


CHART XIII.

CHART XIII.

Death rate from all causes in cities of U. S. from Sept. 28 to Nov. 16, 1918.

In Army and Navy Training Camps Near Chicago. According to reports of the Surgeon-General, the outbreak at Camp Grant was unusually severe. These reports show a high admission rate for the camp for the week ending October 4, only, when it was 10,404.3, as compared with 3,643 for the week ending September 27, and 2,644.4 for the week ending October 11. The figures show a rapid rise and fall and shorter course of the disease as compared with civilian life. Hirsch and McKinney⁶ also call attention to these characteristics of the outbreak and show the same in their graphs depicting the course of the disease. The disease started there on September 21. The maximum death rate of 115 was reached on October 6, from which date it rapidly declined to 12 on the 16th day of the same month. Their report shows that the greatest admission rate occurred on September 30, from which date it declined rapidly and reached the minimum again on October 15.

The outbreak at this camp ran its entire course before the maximum manifestations of the epidemic were experienced in Chicago on October 17.

6) J. A. M. A.—Vol. 71,—No. 21, pg. 1735.

Great Lakes Naval Training Station. The onset of the recent outbreak of influenza at the Great Lakes Naval Training Station occurred on September 8. From that day the local outbreak there advanced very rapidly, reaching its maximum on September 18. The weekly admission rate reached 7,777 per 1,000 on an annual basis during the week ending September 22. Following that date the disease declined rapidly, a practically normal admission rate occurring again on September 30.

With a view of elucidating on the possible influence of climatic conditions on the death rates as observed during the

Table XII.

MAXIMUM WEEKLY ADMISSION RATES IN U. S. ARMY CAMPS AND
DATES OF OCCURRENCE.

Eastern Camps	Week Ending	Rate
Syracuse	September 27	7479.0
Devens	" 20	10412.6
Meade	October 4	8220.8
Upton	" 4	5238.4
Hancock	" 11	5223.6
Dix	November 15	6763.1
Middle West Camps		
Grant	October 4	10404.3
Sherman	" 4	8043.9
Sheridan	" 11	8122.0
Custer	" 11	7742.3
Dodge	" 11	15086.0
Funston	" 11	7161.6
Taylor	" 11	6967.5
Far West Camps		
Lewis	" 18	4438.3
Fremont	" 25	5922.7
Cody	November 1	10148.0
Kearney	" 1	3410.2
Southern Camps		
Logan	September 27	8367.7
Beauregard	October 4	8685.5
Bowie	" 4	8400.6
Wadsworth	" 4	4223.3
Lee	" 4	5300.0
Pike	" 4	8922.4
Jackson	" 4	5839.2
Gordon	" 4	6012.6
Humphreys	" 4	5686.7
Sevier	" 4	4778.6
Travis	" 11	12457.5
Eustis	" 11	3742.5
Johnston, J. E.	" 11	4592.0
Forrest	" 11	8791.5
Greenleaf	" 11	7464.2
Greene	" 11	8472.7
McClellan	" 13	5217.9
MacArthur	" 11	11178.6
Wheeler	" 25	4896.2
Shelby	November 1	6967.5

epidemic in various sections of the country, Table XII is here presented showing the maximum weekly admission rates in army camps in various sections of the country. The highest weekly death rates for various cities of the United States have already been referred to above and are shown in Table XI.

A study of table XII shows that unusually high weekly admission rates occurred in camps located in all sections of the country. From this and the foregoing Chart XIII, showing the relative height of the waves of the epidemic in various cities, it appears that the geographic location and climatic conditions incident thereto do not alone explain the variation in death rates observed in various cities and military camps.

STATISTICAL STUDY OF 1918 EPIDEMIC DEATH RATES.

In Tables XIII to XV, inclusive, (see inserts) are given the principal data in regard to the deaths that occurred from the acute respiratory diseases and all causes during the months of October, 1918, when the epidemic was at its height; September, 1918, the month in the latter third of which the outbreak started, and March, 1917, when an unusually large number of deaths occurred from pneumonia in this city.

These tables are of interest because they show how the various sociologic groups were affected by the increased death rate resulting from the epidemic of influenza in October, 1918, and the difference between this epidemic and the outbreak of pneumonia in March, 1917.

Distribution of Deaths by Sexes and Marital State of Decedent. Under normal conditions the deaths of males considerably exceed those of the females, but during the recent epidemic of influenza and pneumonia this disparity seems to have been very nearly obliterated. It was further noted that

Table XVI.

SUMMARY OF INFLUENZA AND PNEUMONIA DEATHS DURING SEPTEMBER AND OCTOBER, 1918, BY SEX AND MARITAL STATE.

		Male	Female	Male	Female
September	Single	19	11	56	47
	Married	13	16	47	31
		*6 single	*5 married	*9 single	*16 single
October	Single	1048	877	675	569
	Married	1013	1242	615	723
		*15 single	*395 marr.	*60 single	*154 marr.

*Increase in group indicated.

Table XIII.
DEATHS FROM ACUTE RESPIRATORY DISEASES AND ALL CAUSES IN CHICAGO DURING
MONTH OF OCTOBER, 1918.

DISEASES	Total	Color or Race			Social Status					AGE AT DEATH																	PLACE OF DEATH																	
		White	Black	Chinese	Single	Married	Widowed	Divorced	Unknown	0-1 day	1-7 days	7 days, 6 months, 1 year	1-2 years	2-3 years	3-4 years	4-5 years	5-10 years	10-20 years	20-30 years	30-40 years	40-50 years	50-60 years	60-70 years	70-80 years	80-90 years	90-100 years	100 years-over	Resident			Non-Resident				Residence Not Stated									
																												Residence	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	TOTAL HOSPITALS			
Pneumonia	2747	2605	138	4	1244	1338	135	15	15	...	3	67	102	195	104	72	56	128	174	737	651	227	113	57	49	10	2	...	2209	37	426	3	...	2	51	2	13	...	3	1	...	519		
All Forms	2747	2605	138	4	1244	1338	135	15	15	...	3	67	102	195	104	72	56	128	174	737	651	227	113	57	49	10	2	...	2209	37	426	3	...	2	51	2	13	...	3	1	...	519		
Influenza	4376	4236	132	8	1925	2255	173	11	12	...	2	49	123	225	143	129	69	227	312	1356	1124	343	145	88	27	12	2	...	2994	564	639	10	4	42	74	1	22	...	7	13	3	...	1339	
Acute	4376	4236	132	8	1925	2255	173	11	12	...	2	49	123	225	143	129	69	227	312	1356	1124	343	145	88	27	12	2	...	2994	564	639	10	4	42	74	1	22	...	7	13	3	...	1339	
Bronchitis	63	56	7	..	63	1	17	15	13	5	6	6	63
Above three	63	56	7	..	63	1	17	15	13	5	6	6	63
Diseases	63	56	7	..	63	1	17	15	13	5	6	6	63
Combined	7186	6897	277	12	3232	3593	308	26	27	...	6	133	240	433	252	207	131	355	486	2093	1775	570	258	145	76	22	4	...	5266	601	1065	13	4	44	125	3	35	7	16	4	3	...	1858	
All Causes	10249	9810	423	16	4603	4756	784	55	51	84	97	355	366	588	319	250	164	439	615	2384	2113	891	624	482	326	128	23	1	7474	885	1524	36	46	54	185	6	78	15	33	25	8	...	2596	

DISEASE	Total	Sex		PLACE OF BIRTH																																												
		Male	Female	DECEDENT																		BOTH PARENTS			FATHER			MOTHER			MOTHER																	
				Chicago	United States Elsewhere	Ireland	England, Scotland, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown	United States	Foreign	Unknown	United States	Foreign	Unknown	United States	Foreign	Unknown	Chicago	United States Elsewhere	Ireland	England, Scotland, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown
Pneumonia All Forms	2747	1332	1395	969	756	61	28	89	115	17	56	160	175	36	22	4	77	99	22	32	29	477	1785	144	95	218	28	157	82	102	173	461	158	57	231	190	29	64	207	359	75	34	10	129	251	28	45	246
Influenza Acute	4376	2137	2239	1437	1213	105	45	122	189	34	71	331	262	74	25	15	147	185	35	64	22	694	2936	222	178	322	24	213	130	181	213	694	268	73	367	299	54	105	436	529	158	34	16	247	347	48	85	403
Bronchitis Above three Diseases Combined	63	34	29	45	17	1	17	36	...	3	7	...	6	3	1	7	16	3	...	1	11	1	16	1	10	1	...	1	
All Causes	7186	3523	3663	2451	1986	166	73	211	304	51	127	491	437	111	45	19	224	284	57	96	51	1188	4757	366	276	547	52	376	215	284	393	1171	429	130	599	495	114	169	643	904	234	68	26	376	608	77	130	650
	10249	5125	5124	3433	2912	282	129	443	379	68	146	594	581	165	52	25	337	364	77	175	87	1753	6650	599	388	778	81	535	296	416	574	1714	700	218	955	663	114	215	800	1246	323	84	38	536	761	105	188	1015

Table XIV.

DEATHS FROM ACUTE RESPIRATORY DISEASES AND ALL CAUSES IN CHICAGO DURING
MONTH OF SEPTEMBER, 1918.

DISEASE	Total	Color or Race				Social Status					AGE AT DEATH																			PLACE OF DEATH															
		White	Black	Chinese	Others	Single	Married	Widowed	Divorced	Unknown	0-1 day	1-7 days	7 days— 6 months	6 months,— 1 year	1-2 years	2-3 years	3-4 years	4-5 years	5-10 years	10-20 years	20-30 years	30-40 years	40-50 years	50-60 years	60-70 years	70-80 years	80-90 years	90-100 years	100 years-over	Unknown	Resident					Non-Resident					Residence Not Stated				
																															Residence	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	TOTAL HOSPITALS	
Pneumonia	190	181	8	1	...	103	78	8	...	1	...	2	12	15	13	6	2	2	6	14	48	35	13	9	7	4	2	107	16	56	9	...	1	1	82	
All Forms	61	59	2	30	29	2	1	...	3	2	2	26	17	4	3	1	2	39	2	12	3	4	...	1	21		
Influenza
Acute
Bronchitis	12	11	1	12	3	6	2	1	11	1	1	
Above three Diseases
Combined	263	251	11	1	...	145	107	10	...	1	...	2	16	21	18	7	2	2	8	16	74	52	17	12	8	6	2	157	19	68	3	13	...	2	1	104	
All Causes	2605	2452	144	8	1	1266	894	408	17	20	48	51	272	174	100	47	30	15	84	111	244	289	263	295	282	187	97	14	2	...	1689	230	500	14	25	15	82	1	15	10	10	9	5	847	

DISEASES	Total	SEX		PLACE OF BIRTH																																												
		Male	Female	DECEDENT																	BOTH PARENTS			FATHER			MOTHER			MOTHER																		
				Chicago	United States Elsewhere	Ireland	England, Scotland, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown	United States	Foreign	Unknown	United States	Foreign	Unknown	United States	Foreign	Unknown	Chicago	United States Elsewhere	Ireland	England, Scotland, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown
Pneumonia	190	108	82	76	63	2	2	6	3	2	1	10	7	2	1	...	6	5	1	1	1	46	102	9	11	22	...	19	3	6	21	45	13	4	16	13	2	...	16	11	3	1	1	9	12	2	6	15
All Forms	61	33	28	16	26	4	2	2	2	1	...	1	1	2	1	...	1	2	...	17	30	7	2	4	1	5	2	...	4	18	7	2	5	1	2	...	2	3	2	3	2	1	2	7
Influenza
Acute	12	7	5	9	3	1	8	3	...	2	...	1	2	1
Bronchitis
Above three
Diseases
Combined	263	148	115	101	92	6	5	8	5	3	1	11	8	2	1	2	7	5	2	3	1	64	140	16	13	29	1	26	10	7	27	64	20	6	21	14	4	...	18	17	3	1	3	13	18	3	8	23
All Causes	2605	1434	1171	826	820	110	48	212	69	19	18	109	78	52	7	2	90	47	11	58	29	537	1543	196	102	198	29	144	75	110	162	520	218	68	300	175	30	34	152	224	76	21	10	120	107	23	59	306

Table XV.

DEATHS FROM ACUTE RESPIRATORY DISEASES AND ALL CAUSES IN CHICAGO DURING
MONTH OF MARCH, 1917.

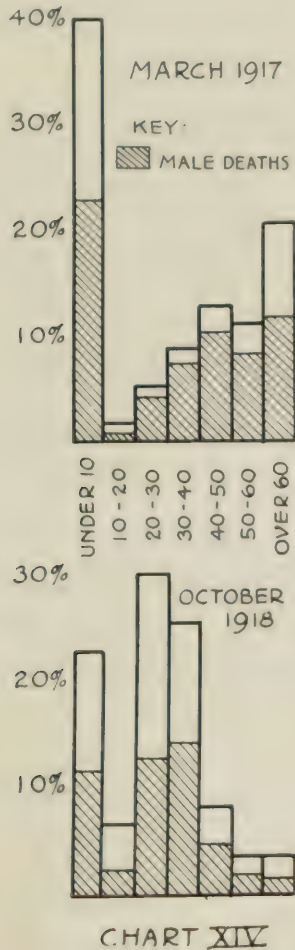
DISEASE	Total	COLOR OR RACE			SOCIAL STATUS					AGE AT DEATH																	PLACE OF DEATH														
		White	Black	Chinese	Single	Married	Widowed	Divorced	Unknown	0-1 day	1-7 days	7 days,— 6 months	6 months,— 1 year	1-2 years	2-3 years	3-4 years	4-5 years	5-10 years	10-20 years	20-30 years	30-40 years	40-50 years	50-60 years	60-70 years	70-80 years	80-90 years	90-100 years	Resident			Non-Resident			Residence Not Stated							
																												Residence	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	Cook County	Chicago Hospitals	Other Institutions	Other Places Chicago	TOTAL HOSPITALS
Pneumonia All Forms	785	734	51	...	437	252	85	3	8	...	5	93	73	86	28	10	7	15	17	44	68	100	87	86	43	17	1	548	103	93	1	4	6	15	...	4	6	1	3	224	
Influenza Acute	33	32	1	...	5	15	13	2	1	1	1	4	3	2	5	7	7	...	29	...	3	1	3	
Bronchitis Above three Diseases Combined	52	50	2	...	52	2	24	15	7	3	...	1	50	...	2	2	
All Causes	870	816	54	...	494	267	98	3	8	...	7	117	95	93	31	11	8	15	18	45	72	103	89	91	50	24	1	627	103	98	1	4	6	15	...	4	6	1	2	3	229
	3871	3685	185	1	1825	1390	536	28	42	53	93	318	172	198	106	51	50	133	138	322	387	470	490	457	293	129	11	2586	439	591	11	48	21	88	1	22	21	12	24	7	1172

DISEASE	Total	SEX		PLACE OF BIRTH																																												
				DECEDENT																BOTH PARENTS			FATHER			MOTHER			MOTHER																			
		Male	Female	Chicago	United States Elsewhere	Ireland	England, Scotland, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown	United States	Foreign	Unknown	United States	Foreign	Unknown	United States	Foreign	Unknown	Chicago	United States Elsewhere	Ireland	England, Scotland, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown
Pneumonia All Forms	785	517	268	276	256	40	17	49	15	6	1	21	15	10	1	...	25	17	4	17	15	177	430	83	35	55	5	48	20	27	51	174	61	25	72	53	5	9	37	50	17	3	...	38	59	5	16	110
Influenza Acute	33	11	22	3	14	4	2	6	1	...	1	2	4	18	6	3	1	1	1	2	2	..	5	6	2	6	1	...	1	3	1	8
Bronchitis Above three Diseases Combined	52	34	18	46	6	13	32	...	2	5	...	5	2	...	6	12	2	...	1	8	...	2	3	7	2	1	8
All Causes	870	562	308	325	276	44	19	55	15	6	2	21	16	10	1	...	27	17	4	17	15	194	480	89	40	61	6	54	24	29	57	191	69	27	79	61	5	12	40	58	19	3	...	42	68	5	16	118
	3871	2234	1637	1191	1253	189	80	336	89	25	27	127	96	76	4	6	153	71	14	77	57	777	2237	381	148	296	32	215	101	160	217	775	361	112	509	229	33	64	192	236	113	9	8	198	175	20	79	541



the greatest increase in deaths of females from these causes occurred among the married females. The data upon which these conclusions are based are shown in Table XVI.

The sex distribution for age groups of deaths from influenza and pneumonia for October, 1918, as compared with March, 1917, is shown in Chart XIV. The marked difference in the proportion of sexes in the age groups 20 to 40 years is especially striking, the large predominance of males in the pneumonia outbreak of March, 1917, contrasting very strikingly with the approximately equal distribution of males and females for the deaths occurring during the height of the influenza outbreak in October, 1918. The same approximate



Sex and Age Distribution of Deaths from Influenza and Pneumonia for October, 1918, Compared with March, 1917.

proportion of the distribution by sexes in the 30 to 40 year group as in the 20 to 30 group excludes the draft as a factor entirely responsible for this distribution.

Age Distribution of Deaths. A study of the age distribution of the deaths from influenza and pneumonia shows that the largest percentages of deaths occurred in persons between 20 and 40 years and under 10 years of age. The percentage distribution of all deaths from influenza and pneumonia during the month of October, 1918, by age groups is shown in the lower diagram of Chart XIV.

By comparison with the upper diagram in this chart, the contrast is shown between the age distribution in the deaths

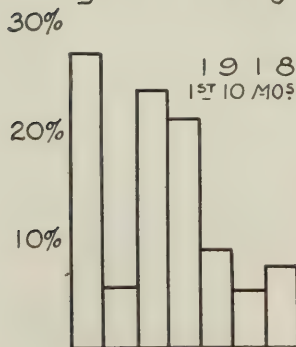
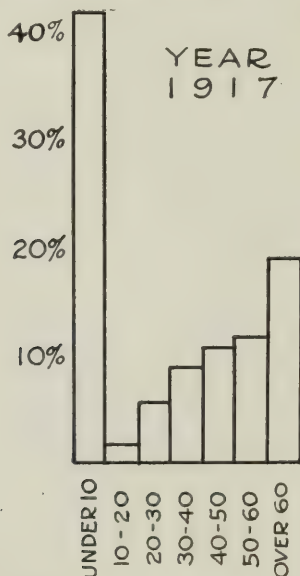


CHART XV

Percentage Distribution, by Ages, of all Deaths from Pneumonia and Influenza in 1917 and First Ten Months of 1918.

occurring during the recent outbreak and in the deaths from pneumonia during March, 1917, when this disease was unusually severe, the annual rate reaching 36.1 per 10,000.

The dissimilarity in the age incidence of the deaths is likewise indicated in Chart XVI, on which is shown the percentage distribution by ages of all deaths from pneumonia and influenza occurring in the entire year of 1917 and the first 10 months of 1918.

The great preponderance of children under 10 years affected in 1917 and of the age group from 20 to 40 in 1918, stands out prominently in the diagrams of these charts. Inasmuch as influenza affects principally children and young adults, does this mean that the children were affected in the first year of the outbreak, and the young adults in the second year?

Relative Increase of Deaths in the Various Age Groups. The marked relative increase in the various age groups is further indicated in Chart XVI. This shows the relative numerical and percentage increase in deaths from influenza and pneumonia during the 1918 influenza epidemic from September 22 to November 12, over the period from August 1 to September 21, inclusive, just preceding the outbreak, each period covering 21 days.

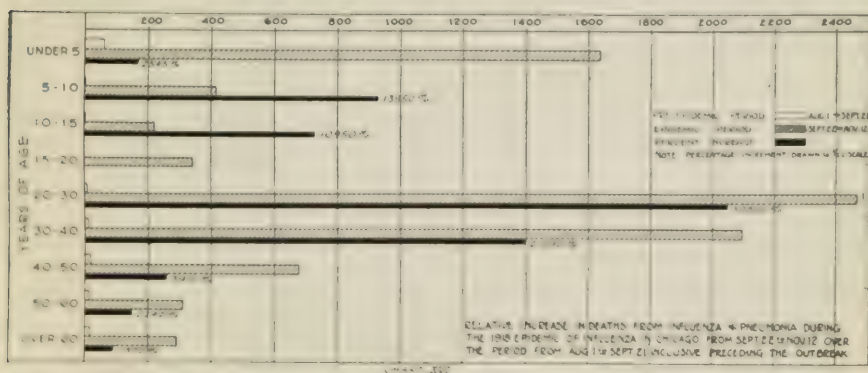


CHART XVI.

Relative Increase in Deaths from Influenza and Pneumonia During 1918 Epidemic from Sept. 22 to Nov. 12, Over Period from Aug. 1 to Sept. 21.

The 30,800 and 21,090 per cent. increases shown respectively in the age groups 20 to 30 and 30 to 40 years contrast very strikingly with the 13,950 and 10,950 per cent. increases for the two school age periods, namely, the 5 to 10, and 10 to 15 year groups.

The relatively small per cent. increase shown in the age

groups under five and over 40 years is still more striking. These figures can lead to but one conclusion, namely that the recent epidemic affected especially the young adults.

Race Distribution. A study of the degree in which the white and black races were affected in the outbreak is shown in Chart XVII. The relative variation in the number of deaths occurring from pneumonia and influenza among each of these races is shown by the number of such deaths occurring in October, 1918, compared with the number in the same period one year ago, and in the month just preceding the recent epidemic.

The percentage increase is figured on the basis of the increase in October, 1918, over the average number of deaths recorded during October, 1917, and September, 1918.

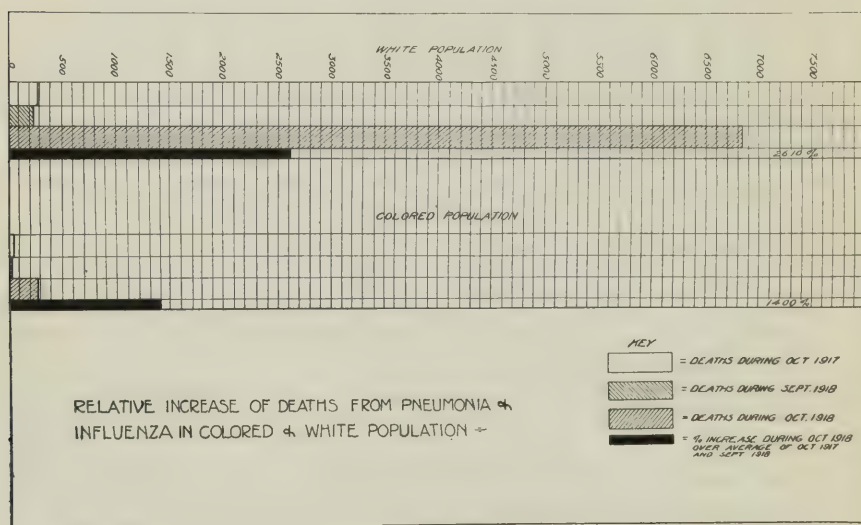


CHART XVII

CHART XVII.

Relative Increase of Deaths from Pneumonia and Influenza in Colored and White Population.

The white population of the city, according to this comparison, showed an increase of 2610 per cent. deaths from influenza and pneumonia during the month of October, as compared with an increase of only 1400 per cent. for the colored residents.

Nationalities Affected. The percentage increase in deaths among various nationalities is shown in Table XVII. In this table the number of deaths from acute respiratory diseases for October, 1918, as compared with the number occurring in September just preceding is shown according to the place

of birth of decedent and nationality of mother. There was only an excess of 49 deaths from acute respiratory diseases in September, 1918, as compared with the same period one year ago, hence this month, although slightly affected, may still be used for making the comparison. The reason for using the mortality rates of September, 1917, instead of those for October, 1918, in this comparison and other charts and

Table XVII.
PLACE OF BIRTH OF DECEDENTS AND NATIONALITY OF MOTHER.

	DECEDENT																		
	Chicago	United States	Elsewhere	Ireland	England, Scot- land, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown
October, 1918	2451	1986	166	72	211	394	51	127	491	437	111	45	19	224	284	57	96	51	
September, 1918	101	92	6	5	8	5	3	1	11	8	7	1	1	7	5	2	3	1	
Increase	2350	1894	160	68	203	289	48	126	480	429	109	44	17	217	279	55	93	50	
Per Cent Increase	2326	2600	2666	1360	2740	5980	1600	12600	4364	5362	3450	4400	850	3100	5580	2750	3100	5000	

	MOTHER																		
	Chicago	United States	Elsewhere	Ireland	England, Scot- land, Wales	Germany	Austria	Other Germanic	Hungary	Russia	Poland	Bohemia	Lithuania	Other Slavic	Scandinavia	Italy	Other Latin	Other Foreign	Unknown
October, 1918	393	1171	429	130	599	495	81	169	643	904	234	68	26	376	698	77	130	650	
September, 1918	27	64	20	6	21	14	4	0	18	17	3	1	3	3	13	3	8	23	
Increase	366	1107	409	124	578	481	80	169	625	887	231	67	23	363	590	74	122	627	
Per Cent Increase	1393	1870	2045	2067	2752	3435	2000	1690	3485	5159	5700	6700	766	2792	3277	2466	1525	2735	

tables in this article, is to eliminate the factor of error resulting from the change of population in the course of a year brought about by the draft and other consequences of the war.

The greatest relative percentage increase in deaths occurred among the Bohemian, Lithuanian and Polish nationalities. The lowest increases were noted among the native born. The low figure recorded for "Other Slavic" when considered together with the high rates for the Slavic enumerated above can probably be ignored as a possible error in the death certificates. Persons born in Hungary, Italy or Austria showed very high death rates.

Duration of Illness. The duration of the illness, as stated on the death certificate, is shown in Table XVIII for three approximately equal periods of the epidemic, from September 22 to November 3, inclusive.

Table XVIII.

DURATION OF ILLNESS, DURING 1918 INFLUENZA EPIDEMIC.

DURATION IN DAYS*										
Period	1	2	3	4	5	6	7	8	9	10
INFLUENZA										
I. Sept. 22 to Oct. 12, inc....	11	31	60	66	88	80	116	53	33	86
II. Oct. 13 to Nov. 3, inc....	38	112	179	256	303	284	470	242	119	570
III. Nov. 4 to Nov. 25, inc....	4	19	26	19	50	55	76	52	23	178
TOTAL.....	53	162	265	341	441	419	662	347	175	834
PNEUMONIA										
I. Sept. 22 to Oct. 12, inc....	23	59	79	87	95	63	98	64	25	58
II. Oct. 13 to Nov. 3, inc....	42	96	173	190	227	173	263	132	86	267
III. Nov. 4 to Nov. 25, inc....	10	26	29	32	43	31	32	33	15	94
TOTAL.....	75	181	281	309	365	272	393	229	126	419

*Duration of illness as stated on death certificate.

Deaths for which certificate did not state duration of illness are not included.

The figures show that during the first period, which covers the first three weeks of the disease, the largest number of deaths recorded from influenza or pneumonia resulted after an illness of seven days. During the second and third periods of the disease the number of deaths occurring after an illness of 10 days' duration or longer predominated.

Effect of the Epidemic on Persons Suffering from Tuberculosis. The mortality records show the death rate from pulmonary tuberculosis during October, 1918, when the epidemic occurred, was 12.92 per 10,000, as compared with 12.75 per 10,000 on an annual basis in the same month a year ago. During November, 1918, when the epidemic was on the decline, the pulmonary tuberculosis death rate was 11.33 per 10,000 as

compared with 11.17 per 10,000 during November of the preceding year.

As to the influenza morbidity in persons suffering from tuberculosis the records of the Municipal Tuberculosis Sanitarium show that of the 587 active cases of pulmonary tuberculosis under treatment there, six per cent. developed influenza, while 46.2 per cent. of the 154 patients having glandular tuberculosis were thus affected.

A survey of approximately 8,500 pulmonary tuberculosis cases, of the total of 24,553 cases in the homes under supervision by the Municipal Tuberculosis Sanitarium Dispensary system, shows that only 51 or 0.6 per cent. of the cases covered by the special survey developed influenza during the epidemic.

COMPARISON OF 1918 AND 1890-1893 EPIDEMICS OF INFLUENZA IN CHICAGO.

The first marked wave of 1890-1893 pandemic of influenza struck Chicago in January, 1890. In that month the total annual death rate per 1000 reached 26.8 as compared with 15.8 in the same month of the previous year. The combined death rate recorded from influenza, pneumonia and bronchitis was 89.7 per 10,000 on an annual basis during the same month.

The next pronounced wave of deaths from acute lung diseases came in the following March and April (1891), when an annual rate of 112.3 per 10,000 was reached for the two months' period.



CHART XVIII.

Relative Increase in Deaths from All Causes in Various Age Groups During First Month of 1890 Influenza Epidemic in Chicago Over Same Period in Preceding Year.

The deaths from all causes during the month of January, 1890, were distributed by age groups, as shown on Chart XVIII.

The relative increase in the deaths occurring in the various age groups over the number occurring during the same month of the previous year is shown numerically and by percentages on this same chart.

The number of deaths from all causes in January, 1890, was 2,501 as compared with 1,255 in January, 1889. During this period some territory was annexed to the city and consequently the increase in the percentage of deaths shown for the different age periods of 1890 over those of 1889 is slightly greater than the actual increase, but the relative proportion of the percentage of the excess number of deaths as shown for the different age groups is probably fairly accurate for the basis of this inquiry.

Comparison of the data on this chart with the proportionate increases in the various age groups, as reported during the influenza outbreak in September and October, 1918, as given in Chart XVI, shows that the 1890 epidemic did not affect such a disproportionately large number of persons in the 20 to 40 age groups.

The unusually large number of deaths occurring in March, 1891, which apparently represented a secondary exacerbation of the epidemic was distributed by age groups as is shown in Table XIX. This table also shows the percentage distribution, by ages, of the deaths from all causes for the months of January, 1890, March, 1917 and October, 1918.

Table XIX.

PERCENTAGE DISTRIBUTION BY AGE GROUPS OF DEATHS FROM ALL CAUSES, DURING MONTHS SHOWING A HIGH DEATH RATE FROM INFLUENZA OR ACUTE RESPIRATORY DISEASES.

Age	January 1890	%	March 1891	%	March 1917	%	October 1918	%
Under 5	1085	43.4	1466	43.1	1038	26.8	2227	21.7
5-10	97	3.9	131	3.8	135	3.5	441	4.3
10-20	89	3.6	135	4.0	139	3.7	615	6.0
20-30	248	9.8	252	7.4	321	8.3	2376	23.7
30-40	234	9.4	304	8.9	388	10.0	2108	20.6
40-50	230	9.2	275	8.1	466	12.0	900	8.8
50-60	217	8.7	257	7.5	490	12.7	620	6.0
60-70	151	6.0	277	8.2	457	11.8	483	4.7
70-80	97	3.9	191	5.6	296	7.6	328	3.2
Over 80	53	2.1	117	3.4	141	3.6	151	1.5
TOTAL	2501	100%	3405	100%	3871	100%	10249	100%

The data in this table, although figured on a different basis than charts XVI and XVIII also show that the great

increase of deaths in the 20 to 40 age groups is characteristic only of the outbreak occurring in October, 1918, and that in respect to ages affected the waves of the epidemic in January, 1890, and March, 1891, were not very different from the pneumonia outbreak in March, 1917.

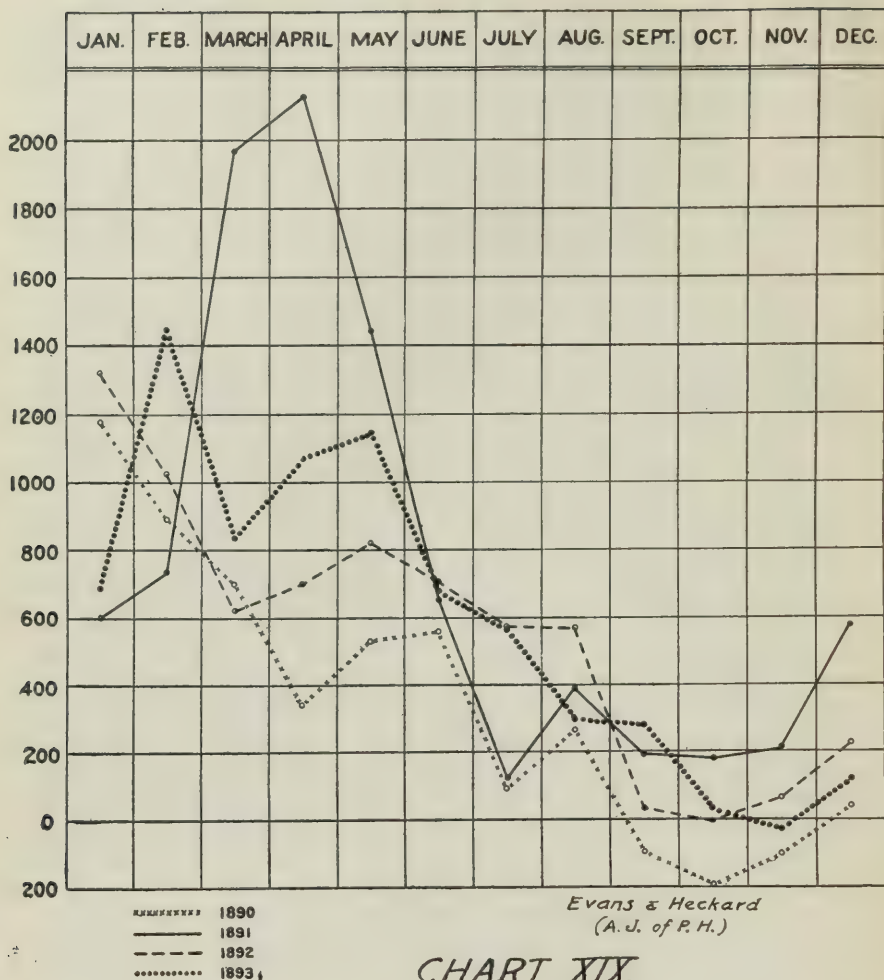
The effects of the influenza epidemic, starting in 1890, on the death rates of Chicago from 1890 to 1893, have been studied by Evans and Heckard.⁷ In a diagram, Chart XIX, they show the relation of the recorded death rate to the expected death rate for each month of this period.

The expected death rate, used as a basis of this chart, was determined by using the distribution of deaths in 1889 as representing the number of deaths occurring each month under normal conditions just prior to the epidemic, and then increasing this number by 5.2 per cent., which figure represents the increase of the population in one year. To get the number of deaths normally to be expected in January, 1890, they added 5.2 per cent. to number of deaths which occurred in January, 1889. This process was repeated for each of the twelve months. To get the number of deaths expected in January, 1891, they added 5.2 per cent. to the number of expected deaths for January, 1890. This process was repeated for each month. The same plan was followed in arriving at the expected deaths for the months of 1892 and 1893. In this way they established the base line for their chart. Hence Chart XIX shows how much the deaths each month rose above or fell below the base line. The death-rates were heavy in the respiratory disease months and light in the summer, autumn and early winter. They think that this diagram proves that the effect of influenza was felt each late winter and spring until and including the year 1893.

Each year since the epidemic of 1890-93 a certain number of deaths from the disease have been reported in Chicago. The period of greater fatality, according to the reports of causes of death recorded, seems to occur in cycles. The marked increases on record are 311 deaths from the disease in 1899, 334 in 1908 and 404 in 1916. While it is true that these causes of death are probably largely based on clinical diagnosis not supported by bacteriologic examinations, yet the increase in the number of such causes of death recorded in these periods is worthy of note.

Another feature which is characteristic of these figures is that each of the waves really covers a period of about three years, a relatively larger number of cases being recorded in

⁷) J. A. P. H. Assoc.—Vol. VIII, Nov. 1918, pg. 845.



Deaths from all causes by months as compared with expected deaths on basis of deaths in 1889 plus 5.2 per cent each year for increase in population. The zero line represents expected deaths. The lines above the zero line indicate number of deaths above the expected. Those below zero line indicate number of deaths less than the expected. Chicago.

the year preceding and just following the year on which the high number was recorded. Between these waves there is usually an interval in which there are comparatively few deaths from influenza reported.

THE BACTERIOLOGY OF THE 1918 OUTBREAK.

The bacteriologic evidence with reference to the identity of the micro-organism initially responsible for the recent

pandemic of influenza is not sufficient to justify definite conclusions at this time. The incidence of Pfeiffer's bacilli is extremely variable as reported by observers in different parts of the world and even by workers in nearby localities. The British Medical Research Committee⁸ in a comprehensive summary of the European literature, inclines to the view that Pfeiffer's bacillus is not the cause of the influenza, and regards the disease as probably caused by a filterable organism. Roux, Nicolle and Lebailly of the Institut Pasteur at Tunis⁹ have reported the discovery of a small micro-organism "different from all hitherto described organisms"¹⁰ and capable of passing through a Chamberlain filter. On the basis of experiments with monkeys and also upon human subjects, they believe that the organism bears a causal relation to influenza. Averill, Young and Griffiths¹⁰, British observers, reported a high percentage of *B. influenzae* in smears from the sputum, with a Gram-positive diplococcus predominating, while Little et al.,¹¹ also working in Great Britain, reported *B. influenzae* to be entirely absent in another group of cases.

In the United States the early results of Keegan of Boston¹² and Park of New York City,¹³ both of whom reported a high incidence of *B. influenzae*, led to the belief that *B. influenzae* are the primary cause of the epidemic. Later results of other observers working in various parts of the country showed *B. influenzae* to be present in a small proportion of the cases only. Friedlander, et al. working at Camp Sherman, Chillicothe, Ohio¹⁴ found the predominating organism to be a group IV pneumococcus in 53 per cent. of the necropsies. Hemolytic streptococci were present in 47 per cent. of the necropsies; *B. influenzae* were not found more frequently than prior to the epidemic. Hirsch and McKinney¹⁵ at Camp Grant, Rockford, Illinois, concluded that *B. influenzae* played no role in the epidemic and expressed the belief that the bronchial pneumonias were caused by a pneumococcus of unusual virulence.

In Chicago, Tonney reported that a series of 105 sputa examined in the bureau of laboratories of the department of

8) J. A. M. A.—Vol. 71,—No. 19, page 1573.

9) J. A. M. A.—Vol. 71,—No. 20, page 1676.

10) Brit. Med. Jour. 8/3/18,—pg. 111.

11) Lancet, Vol. 2,—No. 4950, 7/13/18.

12) J. A. M. A.—Vol. 71,—9/28/18, pg. 1051.

13) N. Y. Med. Jour.—Vol. 108,—10/12/18, pg. 621.

14) J. A. M. A.—Vol. 71, 11/16/18, No. 20, pg. 1653.

15) J. A. M. A.—Vol. 71, 21, pg. 1735.

health gave 12.4 per cent. *B. influenzae*. In no case, however, were the influenzae bacilli present and the other forms absent, as reported in the epidemic of 1890-1893. Hemolytic streptococci were present in 27.6 per cent. of the specimens. One type II pneumococcus and one type III pneumococcus were isolated and all specimens contained group IV pneumococci and allied strains of green producing organisms. Three specimens of lung tissue from necropsies after terminal bronchial pneumonia showed hemolytic streptococci. Micrococci catarrhalis were present in 21.2 per cent. of the specimens. Hruby¹⁷ of the Municipal Tuberculosis Sanitarium reported that out of 72 cases occurring in the sanitarium, 23 gave an average leucocyte count of 6465 per c.m.m.

From the Cook County Hospital of Chicago¹⁶ Nuzum reported the organisms found in 34 necropsies, as follows:

Influenza bacilli	8.7%
Pneumococci fixed types	49.0%
Pneumococci group IV	50.0%
Hemolytic streptococci	43.0%
Staphylococci	40.0%
Micrococci catarrhalis	0.0%

100 specimens of sputum yielded the following organisms:

Influenza bacilli	4.0%
Pneumococci	70.0%
Hemolytic streptococci	20.0%
Staphylococci	40.0%

At Michael Reese Hospital¹⁸ Strouse and Bloch found the following organisms in the sputum, pleural exudate and blood:

<i>B. influenzae</i>	5.5%
Green producing streptococci	61.0%
Hemolytic streptococci	4.4%
Pneumococci	32.0%
Friedlander's bacilli	7.0%
Staphylococci	46.0%
Micrococci catarrhalis	8.0%

Commenting on the results at hand, it may be stated that while the primary cause of the disease is the subject of conflicting opinion, it is evident that a variety of superimposed infections are principally responsible for the fatal terminations. The kind of superimposed infection varies with the locality and probably depends to an extent on the pre-existing prevalence of particular types of organisms. The organisms associated with the fatal pneumonias in Chicago and vicinity, given in the order of their frequency, are pneumo-

16) J. A. M. A.—Vol. 71, No. 19, pg. 1562.

17) Verbal report.

18) J. A. M. A.—11/9/18, Vol. 71, No. 19, pg. 1568.

cocci, group IV, and allied strains, hemolytic streptococci, staphylococci, and the fixed types of pneumococci. No doubt the leucopenia and depression of phagocytosis which are characteristics of influenza, serve to prepare the soil for the entrance of opportunist organisms which happen to be in the environment.

THE RELATION OF THE BACTERIOLOGY OF THE 1918 OUTBREAK TO THE PNEUMONIA OUTBREAKS OF 1916-1918.

That group IV pneumococci were prevalent in this vicinity during the winter of 1917-1918 appears in data furnished by Tomney from the bureau of laboratories, department of health. The following table, representing the type determinations of pneumococci sputum made in the bureau of laboratories, shows group IV organisms to be in predominance:

Table XX.

BUREAU OF LABORATORIES—SPUTUM SPECIMENS FOR TYPE DIFFERENTIATION OF PNEUMOCOCCI, WINTER OF 1917-1918.

Pneumococci type I	14.3%
" " II	16.7%
" " III	16.7%
" group IV	52.4%
Streptococci	7.1%
B. influenzae	7.1%
Micrococci catarrhalis	11.9%
Total specimens	42.

An unusual prevalence of streptococci also was brought to the attention of the commissioner of health by the bureau of laboratories in December, 1917, in connection with the routine examination of throat cultures for diphtheria bacilli.

Mathers¹⁹ called attention to the high incidence of group IV pneumococci in Chicago in 1915-1916, namely 43 per cent. Hemolytic streptococci were also found in 80 per cent. of his group of 61 cases, and were considered by Mathers to be the cause of an epidemic of respiratory infection which occurred at that time.

The general prevalence of group IV pneumococci in Army camps in the winter of 1917-1918 was pointed out by Vaughan and Palmer²⁰, who also commented on the frequency with which streptococcus pneumonia was reported.

The general prevalence of pneumococci and streptococci above noted may be of significance in explaining the widespread secondary infection with those organisms which followed the appearance of influenza in the community.

19) Jour. Inf. Dis.—Vol. 21, July, 1917, pg. 6.

20) Mil. Surg.—Vol. 43, No. 3, Sept. 1918, pg. 275.

PREVENTIVE MEASURES EMPLOYED TO CONTROL THE EPIDEMIC.

In 1910 the Department of Health of the City of Chicago made pneumonia a reportable disease. In 1916 the department made it a placardable disease, thus definitely placing it in a category with scarlet fever, diphtheria and other contagious diseases.

When it became evident that there would be an outbreak of influenza and pneumonia in the City of Chicago the Department of Health adopted every known plan to limit the spread of the disease. These will be described in detail later in this article. In a great city like Chicago, in which one-fortieth of the population of the entire nation resides, and in war time, when it is absolutely essential to keep the arteries of business open, the plan of closing business and stopping commerce could not be considered for one moment.

The plan adopted was to allow all essential business to continue and prohibit only the unnecessary public assemblages. Following out this policy, places of amusement were closed. This included theaters of all kinds, cabarets, dance halls, athletic meets, and everything of this kind. People were advised to go home and to get nine hours sleep, on the theory that rest was the best preventive that could be had. In fact, by cutting out all of these night assemblages there was no place for the people to go and they had to remain home.

This closing order went into effect on the day when the epidemic was taking its highest death toll. Whether it had any effect on the death rate in Chicago is purely speculative. It surely did have the effect of getting information regarding the disease to every individual in the City of Chicago and it impressed upon the public that care was necessary.

The commissioner of health during the entire epidemic did everything he could to get correct information to the public without at the same time doing it in a manner to create a panic. A large advertisement was placed in the newspapers of the city and pamphlets were printed and distributed giving information in regard to the disease and measures necessary to prevent the same. These together with similar articles inserted each day in the daily papers always carried a message of assurance.

Places of business, churches and schools were not closed. Nothing was done to interfere with the morale of the community.

The epidemic gave the city an opportunity for a most thorough cleaning and renovating of all its places of public assembly. None of these places were permitted to re-open their doors until they had been inspected by the sanitary bureau of the Health Department and a permit issued.

The danger of uncovered coughing and sneezing has probably been so thoroughly impressed upon the people of the City of Chicago that fruit will be borne from this source for years to come.

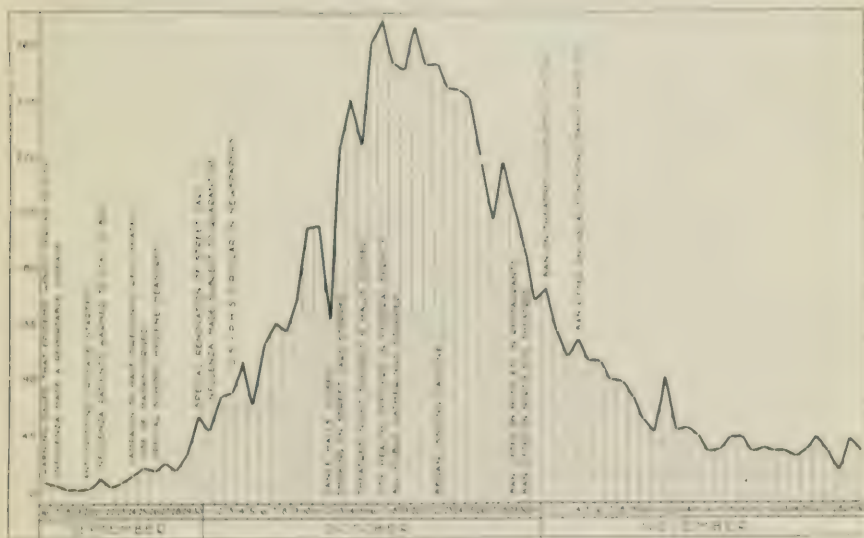


CHART XX.

Principal Preventive Measures taken During Course of Epidemic.

The days on which the principal measures employed to combat the epidemic were instituted are shown on Chart XX.

It is impossible to determine what effect these various measures had upon the course of the disease. Nevertheless it may be assumed that the cumulative effects of all the efforts made to prevent the spread of the disease were the cause of holding the daily death rates of the disease within the limits attained and the maximum weekly death rate from all causes at 63 per 1,000.

FIRST STEPS TAKEN TO COMBAT THE DISEASE.

When an attack of influenza occurred at the Great Lakes Naval Training Station only 32 miles north of Chicago, following the outbreak at Chelsea, Mass., it became evident that the disease would soon spread to this city.

On September 16 the public was warned to this effect. Measures to minimize the danger of spreading the disease through spitting, coughing and sneezing were instituted at once. Placards warning against the danger of these practices were placed in street cars and elevated trains. The general superintendent of police was requested to start another anti-spitting crusade.

On September 16 the commissioner of health, through the public press, proclaimed influenza a reportable disease and in the following number of the Health Department Bulletin the required formal notice was issued, declaring influenza and the so-called "Spanish influenza" to be a contagious or epidemic disease and ordering that cases of the same be reported to the Department of Health in accordance with the provisions of Section 1192 of the Municipal code.

The public was again warned that the disease would occur in the city in epidemic form within two weeks.

On September 21, by a statement published in the newspapers, persons having symptoms of influenza were requested to remain at home and in bed in order to avoid the spread of the disease. In the issue of the department bulletin of that day instructions were given regarding the manner in which one might lessen the danger of contracting or conveying the disease. Attention was called to the danger of contracting pneumonia and to the fact that this is the cause of death in a large proportion of deaths following an attack of influenza.

ADEQUATE HEATING OF LIVING APARTMENTS INSISTED UPON.

When the public was first cautioned in regard to the danger of contracting pneumonia during an attack of influenza and advised in reference to the precautions necessary to prevent both influenza and pneumonia it became evident that these precautionary measures could not be taken unless all living apartments were adequately heated.

The epidemic broke out in the latter part of September. The weather, especially from September 18 to September 26, was unusually cold, yet many landlords refused to supply heat because their leases did not provide for the same before October 1. The lack of fuel and the expense and difficulty in securing repairs to heating appliances also stood in the way of the ample and early heating of all dwellings.

On September 24 the public was advised through the newspapers that complaints of lack of sufficient heat would

be received by the sanitary bureau, and soon numerous complaints were received. During a period of 43 days, from September 26 to November 16, the total number of such complaints received was 1,634, constituting forty per cent. of the total number of complaints received during that period.

In most cases the complainant gave the telephone number of the landlord or agent and where this information was available a respectful demand was made over the telephone that proper temperatures be provided. A courteous response was usually received but in 34 cases the refusal to provide proper temperatures was so definite that more stringent measures were necessary to protect the interests of the sick.

In all cases inspections were made as promptly as the conditions would permit, and in slightly more than one fourth of the cases, 456 in number, it was found necessary to serve the usual departmental notice to provide sufficient heat. In most cases such written demand was promptly complied with. On the advice of the corporation counsel's office suits have been instituted under Section 1433 of the municipal code and Mr. Harry B. Miller, city prosecuting attorney, is of the opinion that these can be maintained on the ground that the conditions of lack of heat are "prejudicial to health."²

In addition to the handling of complaints a canvass of certain rooming houses was made with respect to heating appliances. One hundred thirty-three were inspected between October 8 and 15 and 54 notices issued to provide sufficient heat. Forty-one of the 43 cases held for a second investigation gave satisfactory compliances upon reinspection.

The newspapers gave much publicity to the efforts of the Health Department to have living apartments properly heated. As a result, much more was accomplished than appears in the records of complaints received and investigated. Many landlords furnished heat voluntarily after the notice appeared in the press, and others responded to the request of their tenants. Hence the majority of the complaints handled represented refusals on the part of the landlords or very urgent cases. A threat made to publish the names of landlords refusing to supply heat, brought further compliances.

²Since January 1, 1919, some of these cases have come to trial and the Municipal Court has not hesitated to uphold the Department in the requirement that adequate heat conditions be maintained in steam-heated flats. A fine of \$100.00 was imposed in one of the cases and lesser fines where heat had been provided before the cases were tried.

Table XXI.

DAILY TEMPERATURES AND COMPLAINTS OF INADEQUATE
HEATING OF LIVING APARTMENTS.

Date:	Inadequate heat complaints:	Total refusals to furnish heat:	Minimum outside temperature:	Departure of Mean from Normal:
Sept. 26	38	1	49	— 8
" 27	106	3	47	— 3
" 28)			52	+ 2
" 29)	161	5		— 4
" 30	57	1	49	— 8
Oct. 1	106	0	45	—10
" 2	133	2	49	— 5
" 3	20	0	50	— 5
" 4	41	0	54	+ 7
" 5	16	0	66	+15
" 7	25	0	52	— 2
" 8	38	0	48	— 1
" 9	45	0	53	+ 7
" 10	27	1	56	+10
" 11	14	0	60	+10
" 12	11	1	58	+ 9
" 14	20	0	46	— 3
" 15	77	5	50	+ 9
" 16	46	0	56	+ 6
" 17	18	4	54	+14
" 18	19	0	49	+ 1
" 19	15	0	48	+ 2
" 21	46	0	48	+ 1
" 22	55	0	49	+ 5
" 23	52	2	56	+ 8
" 24	51	2	53	+ 7
" 25	34	1	45	+ 1
" 26	21	0	51	+ 8
" 28	27	3	46	+ 5
" 30	20	0	43	+ 2
" 31	12	1	37	— 4
Nov. 1	58	1	35	— 6
" 2	24	1	36	+ 1
" 4	38	0	47	+ 6
" 5	21	0	45	+ 7
" 6	12	0	44	+13
" 8	38	0	48	+11
" 9	12	0	41	+ 2
" 12	32	0	39	+ 7
" 13	21	0	37	+ 4
" 14	10	1	42	+13
" 15	15	0		
" 16	6	0		
Total	1638	35		

INFLUENZA COMMISSION.

In response to the following telegram received from the Chairman of the Medical Section, Council of National Defense, the Illinois Influenza Commission was appointed by Dr. A. J. Ochsner, Chairman of the local medical section:

"A. J. Ochsner, Chairman Medical Section, National Council of Defense, Chicago: Volunteer Medical Corps requested to recommend unit of members for possible temporary service under direction of Public Health Service and Red Cross to combat influenza if epidemic spreads. They report this office within 24 hours if possible as near forty names as possible of men willing to perform this duty if called upon. Compensation \$200.00 monthly and expense for period of service. Duty may call outside of state. Franklin H. Martin, Council of National Defense."

The commission appointed was constituted as follows: Dr. A. A. O'Neill, Medical Director of the Chicago Chapter of the American Red Cross, Chairman, Dr. C. St. Clair Drake, Director of the Illinois State Department of Public Health, Dr. John Dill Robertson, Commissioner of Health of the City of Chicago, Dr. J. O. Cobb, Senior Surgeon, U. S. Public Health Service, Col. Henry I. Raymond, Department Surgeon, U. S. Army, Surgeon Owen Mink, Lieutenant Commander, Medical Corps, U. S. Navy, Marquis Eaton, Chairman of the Chicago Chapter of the American Red Cross, Dr. W. A. Evans, Ex-President of the American Public Health Association.

The Commission did not take over any administrative work; its function was purely advisory, and recommendations made by the Commission were adopted by the state and local health departments. Among the matters considered and acted upon was the advisability of the closing of schools. The decision was that the schools should remain open, thus preventing the congregating of children in large groups, exposure to cold, etc. Hospitals were closed to visitors. Funerals were made private; theaters and moving picture houses, and other places of public assemblages, dances, etc., were closed. Smoking on all cars was stopped.

The Commission, after an inquiry made in Boston and Washington and after an all-day interview with Dr. E. C. Rosenow, decided to produce and distribute influenza-pneumonia vaccine made after the Rosenow method. At the time of Dr. Rosenow's visit 20,000 persons had been vaccinated with results that seemed to the Commission to warrant pushing the method. It was advised that vaccine be produced in

the laboratories of the Chicago Health Department under the direction of Dr. F. O. Tonney, Director, in consultation with the Committee on Vaccines.

PUBLICITY AND EDUCATIONAL MEASURES.

Education, or the enlightenment, of the people in matters of public health is an important factor in conserving community health because in the last analysis, it means that they will more intelligently aid health officials in the enforcement of such measures as may be necessary to prevent the spread of dangerous diseases and for the saving of human lives.

The Department of Health has long since accepted as a demonstrated fact that knowledge and light are agencies of wonderful might and influence in its never ending fight against the preventable diseases. There will always be those who "having eyes see not and having ears, hear not" the things that vitally concern their physical safety and comfort. And while not all will heed the warnings and advice of health officials, yet it still must be remembered that unless the light be spread, darkness will prevail.

It was along these lines that the commissioner of health conducted what may be termed an intensive campaign of publicity and education, both preceding and during Chicago's influenza outbreak.

The following is a brief outline of methods and mediums used:

Daily Newspapers:—The newspapers were supplied with daily information as to the status of the outbreak, together with advice and warning as to the things that should be done to curb the spread of the disease and to protect the public health. Each day during the course of the epidemic all the daily papers carried one or more articles and oftentimes editorials enlightening the public in reference to the progress of the outbreak and the measures instituted by the Health Department to limit the same. A few typical headlines of such articles are reproduced on Chart XXI.

Warnings to the public were printed nearly every day, oftentimes in the form of "Do's" and "Dont's." The precautionary measures advised to prevent personal infection and to protect others were printed again and again in numerous variations. For example, attention was called to the value of masks by pictures in the newspapers of street department employes, health department nurses, and Red Cross workers. Even the face of the commissioner of health was not spared in this campaign for in a final effort to encour-

age the use of masks a photograph of the commissioner "masked" was used by the newspapers one day to illustrate their articles.

HEALTH ORDER DOOMS LODGE HALL COBWEBS	POLICE RAID SALOONS IN WAR ON INFLUENZA; KEEP CHURCH WINDOWS OPEN	'NONESSENTIAL' CROWDS BARRED IN EPIDEMIC WAR
Grip Ban on All Meetings Un- til Places Are Renovated; 21 Theaters Reopen.	Stringent New Orders Are Issued for Preventing Spread of Epidemic; Police Ambulances Are Drafted; 100,000 Doses of Vaccine on Way.	Churches and Saloons Exempt; Conventions, Athletics, Parties Hit.
GRIP VIGILANCE STILL NEEDED	1,613 NEW CASES SHOW DECREASE IN CITY; DOWNSTATE HIT WORST	FREE DOCTOR <small>Influenza victims unable to pay for a doctor can obtain one by calling Main 467, Local 186, day or night.</small>
Dr. Robertson Warns Against Relaxing Precaution, Despite Wane of Epidemic	FLU CURFEW TO SOUND FOR CITY SATURDAY NIGHT	DRAFT MEN TO BE FIRST INOCULATED FOR "FLU"
'OPEN-FACE' SNEEZERS TO BE ARRESTED	Persons Not on Business Ex- pected to Quit the Streets at 9 o'Clock.	CHURCH WINDOWS MUST STAY OPEN, SAYS ROBERTSON <small>Health Department Gives Out New Rules in Fight on Influenza.</small>

CHICAGO DEPT. OF HEALTH - OCT. 4/1918

CHART XXI.

Headlines in Chicago Newspapers.

In general, the tone of all the articles was such as to guard against undue alarm and panic. On October 3, when reports from the various cities in the east were made known here and when there was a tendency to calculate the anticipated number of cases and deaths for Chicago on a similar basis, the headlines in the newspapers began to take an alarming aspect. Fearing this would have a bad effect upon the people a signed warning against undue alarm was published in all the papers on that day in connection with the article on "Spanish Flu" by the U. S. Public Health Service, which was inserted as a three quarter page ad. (See appendix B.)

Weekly Press Service:—The Health Department supplied articles weekly in popular form, not exceeding 500 words in length, to 136 daily, weekly and monthly publications in the city. This service ordinarily covers many phases of public

health work but during the epidemic was devoted entirely to influenza propaganda with the purpose of securing city wide co-operation in enforcing the protective measures adopted by the Department of Health.

Foreign Language Dailies:—A special daily press bulletin service to the foreign language daily papers was instituted during the course of the epidemic with the purpose of reaching those not reached by the dailies in the English language. The service supplied to the foreign language dailies, lacked the personal interview character of that given to the morning and evening English papers, but it is believed that it was of no less value from an educational standpoint. Following are samples of this service as rendered from day to day:

Special Daily Press Service,
Department of Health,
Chicago, October 24, 1918.

INFLUENZA DONT'S

Don't live in the dark.

Don't shut the sunshine out of your home.

Don't exclude the fresh air.

Don't fail to keep clean.

Don't go into crowded places.

Don't associate with people who sneeze and cough in your presence.

Don't use common towels.

Don't fail to practice what you preach.

Don't overtax your physical powers. Cut out evening entertainments. Be in bed by ten o'clock. Get nine hours sleep.

Don't fail to sleep with every window in your bedroom open.

Don't fail to call your doctor for yourself or any member of your family at the first sign of illness. Better be safe than sorry.

Don't allow your home to become damp, chilly or uncomfortable. See to it that it is kept at a temperature of at least 68 to 70 degrees all the time.

Don't fail, if possible, to walk to your work in the morning and to your home at night. The open air exercise will be of decided benefit.

FOR YOUR HEALTH'S SAKE.

Influenza, which is now prevalent in Chicago, is an epidemic disease.

The infection which causes the disease is found in the mouth, nose and throat. This is why the disease is spread by careless coughing, sneezing and spitting.

Close contact with a person who has influenza, or even a "bad cold," is dangerous.

If you avoid indoor crowds and do not sleep or work in badly ventilated bedrooms and workrooms, you will be less likely "to catch" influenza.

Do not send an ailing child to school. Keep it at home and call your doctor promptly at first signs of real illness.

No school child who has had influenza can be admitted to school until at least eight days from the first day of sickness, and only then, when it is free from coughing, sneezing, discharging nose and sore throat.

Children in a family where there is a case of influenza are not allowed to attend school and must remain on the premises. This means that they must not associate with other children in the neighborhood.

It is important for your own and others' safety that you learn to cough, spit or sneeze in a safe manner. Cough or sneeze into your handkerchief, or better, a soft paper napkin which can be burned; pocket handkerchiefs so used should be thoroughly boiled.

Do not visit a home where there is a case of influenza and thus save carrying the infection back to your own family.

Keep your feet dry and warm. Avoid sudden chills and drafts, undue exertion and exposure.

And finally, don't forget the importance of having plenty of fresh air all the time, whether at work or play, asleep or awake.

Transportation Lines:—Display cards were placed in all surface and elevated car lines, warning the people against the danger of indiscriminate sneezing, coughing and spitting in public places. These warning notices were posted in the street cars of the city early in September and before there were any noticeable manifestations of the presence of influenza in Chicago. These cards read as follows:

"SNEEZING, COUGHING, SPITTING IN PUBLIC PLACES HELP TO SPREAD SUCH DANGEROUS DISEASES AS INFLUENZA, PNEUMONIA, DIPHTHERIA AND CONSUMPTION. IN 1917 THE GERMS THAT

CAUSE THESE FOUR DISEASES KILLED 10,220 PEOPLE IN CHICAGO. COVER YOUR MOUTH AND NOSE WHEN YOU SNEEZE OR COUGH AND HELP TO KEEP CHICAGO HEALTHY."

Department Bulletin:—This is issued weekly and during the epidemic was devoted almost entirely to information in regard to influenza and the giving of information as to the progress of the outbreak, including the morbidity and mortality statistics and the preventive measures recommended by the Health Department.

Posters:—Posters calling attention to the prevalence of influenza and advising the public as to protective measures that were required to prevent further spread were prominently displayed at the entrance of theaters, on elevated station platforms and in other places of public assembly.

Moving Picture Theaters:—Lantern slides were furnished by the Department of Health and shown in every moving picture theater in Chicago, warning the public as to the danger of open and indiscriminate sneezing, coughing and spitting and asking those in attendance suffering with colds to leave the theater and remain in their homes until well.

Personal Interviews:—By far the largest and, therefore, the most important phase of the Department's educational work was carried on by the leading daily papers of Chicago through daily interviews with the commissioner of health, covering not only the daily status of the outbreak, but also such advice and suggestions as the commissioner of health, speaking not only for the Department of Health, but as a member of the Influenza Commission, had to offer. These interviews were, as a rule, front page news stories and so displayed as to share in prominence with all the important matter usually carried on the first page of a metropolitan daily.

Conclusion:—As a result of this intensive campaign along educational lines Chicago's visitation of the epidemic, while costing the city over 8,500 lives, was so held and controlled that at no time did it assume anything like a violent form. The people were not unduly alarmed. The public schools remained open and with the exception of restrictions as to public gatherings of almost every kind, the life of the city was not unnecessarily disturbed. And these gratifying results, it is believed, were materially due to the educational and publicity side of the Department's efforts to bring the outbreak under control.

In this campaign of education the Department was, of

course, dependent almost entirely on the newspapers, the editors of which gave unsparingly of their space and in a spirit which showed that they thoroughly appreciated they were rendering in a time of great need, a most valuable service to the public.

SCHOOL HYGIENE.

With the spread of the influenza epidemic and the threatened outbreak of this disease in Chicago the question as to whether or not the public and parochial schools, in which about 500,000 children assemble daily, should be closed was a serious problem, especially so, inasmuch as in many other cities a precedent of closing had been established.

A conference of prominent representatives of the various agencies actively interested in the children's welfare, was called September 28 by the health commissioner, and the question of closing schools was thoroughly debated with the result that the consensus of opinion was in favor of keeping the schools open for the following reasons:

1. A better knowledge of existing conditions would be had if the schools were made a source of information as to sickness among the children and their families.
2. It would be possible to supervise the children and keep many of them under better conditions during the school hours, than if they were allowed to stay at home and run in streets and alleys or play on premises where persons sick with the disease are domiciled.
3. Because we have an organized staff of physicians and nurses for medical inspection of schools.

Having decided to keep the schools open plans were formulated to increase the safeguards of the children as far as possible. A letter was written to the superintendent of schools requesting that the schools be superheated so as to permit thorough frequent flooding of all rooms with fresh air without chilling the children, and that the rules against dry sweeping be strictly enforced in school buildings. These requests were made because it seemed to be agreed that fresh air and freedom from dust, the avoidance of chilling and everything that tends to reduce vitality, were primary requisites in combating influenza.

Later another letter was sent to the superintendent of schools requesting that during the prevalence of the epidemic all classrooms in all schools be made "open window" rooms; that is that windows remain open all the time in all the

rooms, heat being supplied and the children be permitted to wear their street wraps to avoid any possible chance of becoming chilled. These measures remained in effect until November 16 when conditions had so improved that it was thought safe to return to the regular custom.

On October 3 an order was issued to the staff of physicians and nurses requesting daily reports on conditions in each school visited; this report to cover name of school, temperature conditions, ventilation, dry sweeping, number of absentees, and the attendance and number of absentees under normal conditions.

On October 15 the school health officers and nurses were directed to discontinue all routine work in schools and to concentrate on inspection of school children, to exclude all children having any signs of the disease or prodromal symptoms of the same and to exclude all children coming from a home where there was a case of influenza; also to request all teachers to make inquiry each morning for any child not feeling well and to refer such children to the school doctor for an examination. The doctors and nurses for their own protection were instructed to wear gauze masks when working with children in the isolation rooms.

The school health officers and nurses were ordered to make visits to the homes of as many absentees as possible, to instruct families where there was sickness about proper isolation, care and protection of themselves and the patient and to notify the Department of Health when a family was found that needed medical assistance or relief.

On Sunday, October 20, a meeting of school health officers was called to determine what additional steps might be taken in schools for the benefit of the school children. During the first half of October the staff of school physicians had inspected 104,520 children for contagion and excluded 3,942 children; during the last half of October the school health officers inspected 194,413 children and excluded 4,292.

By October 31 the conditions had improved so that an order was issued directing the staff to again take up their regular work, but to keep watch for influenza. All absentees were subject to a rigid inspection and examination before re-entering school. November 16 an order was issued to discontinue further special daily reports on absentees.

The home calls developed an interesting fact, namely that many of the children were kept from school by their parents because of fear of catching the disease. This state of mind was called "Fluphobia" by one of the health officers.

Some of the children as soon as they learned that a child with a cough would be excluded from school, developed a habit of coughing in the classroom in order to be sent home by the teacher as a "cougher." The proverbial school boy, anxious to play hookie, brought snuff or red pepper to induce the coughing or sneezing, necessary for the desired exclusion from the school.

It was noted during the decline of the epidemic that absentees were not returning as soon as they should with the abatement of the epidemic and steps were taken to get the children back in school. A conference was held with a representative of the Board of Education on October 30, 1918, and it was arranged that the entire staff of truant officers under control of the compulsory education department of the Board of Education be assigned to round up the children, and teachers were directed to send notes home to the parents of children absent, urging their return to school.

The parochial schools were also asked to send their representatives to the homes of absent children to urge the parents to return them to school where there was no further reason for such absence.

All children before readmission to school were examined by the school health officer.

ORGANIZATION OF MEDICAL FIELD WORK.

The rapid increase in the number of reported cases of influenza during the first week of October, 1918, made it impossible for the contagious disease division of the Health Department to efficiently care for the added inspection and other work with the limited field forces available. The department was however, fortunate in this emergency to receive the assistance of the U. S. Public Health Service, which had been given the necessary authority and funds by Congress to enable it to undertake special preventive measures and relief work during the epidemic.

The commissioner of health in a conference with Dr. J. O. Cobb, senior surgeon, U. S. Public Health Service, stationed in Chicago, considered the question of obtaining additional medical service. It was quite obvious that the marked shortage of physicians would make it impossible to obtain the required number of acting assistant surgeons for the U. S. Public Health Service without entering into competition with the Chicago Health Department and drawing upon its health officers. To obviate the possible disruption of the regular Health Department service and also to make available trained health officers for the emergency influenza work, it was mu-

tually agreed that prompt relief could best be provided by urging the school and field health officers who could take on additional work to sign an agreement to give a specified minimum amount of time and work daily to the U. S. Public Health Service in addition to the three hours' service required by the Chicago Department of Health.

A meeting of the bureau of medical inspection field forces was called and the physicians who were able to give the necessary extra time to influenza field work were asked to sign an agreement to accept a position of acting assistant surgeon in the Public Health Service of the United States Government, subject to such orders and instructions as should be promulgated from time to time, and to give a minimum of four hours per day in addition to the time and services required by their positions in the Department of Health of Chicago. The Health Department officers thus appointed were to act in the dual capacity of health officer for the Department of Health and acting assistant surgeon of the U. S. Public Health Service. The compensation offered was \$200.00 per month, the Public Health Service paying the difference between this amount and the health officer's regular salary received from the city.

Such a stirring appeal in the emergency was made by Dr. J. O. Cobb, senior surgeon, U. S. Public Health Service, and the Chicago commissioner of health, that over one hundred physicians—all those present except twenty-two—signed the agreement.

Those who signed up for the work did it with the understanding that they would give a full seven hours a day to the combined influenza work, three hours to be devoted to school inspection service each morning, the other four hours to be spent in the field work in inspection, survey, and medical relief work in connection with the influenza outbreak.

A tentative plan of organization, as read by the commissioner of health, was agreed to broadly as outlined with the reservation that some of the details might have to be changed. Briefly, the adopted plan was to use the seventeen districts already existing in the City of Chicago's Health Department medical inspection organization. In each of these seventeen supervisor's districts, the supervisor already in the territory was to be placed in charge of the field and school health officers assigned to work under him. The existing sixty field health officers' districts were each to be subdivided into three parts of nearly equal size, considering both population and transportation. A health officer was to be assigned to each such sub-district.

The field organization when completed had a supervisor

over approximately ten acting assistant surgeons of the U. S. Public Health Service, each working in a field sub-district in the afternoon. The general plan of organization followed is shown on Chart No. XXII.

OUTLINE of ORGANIZATION

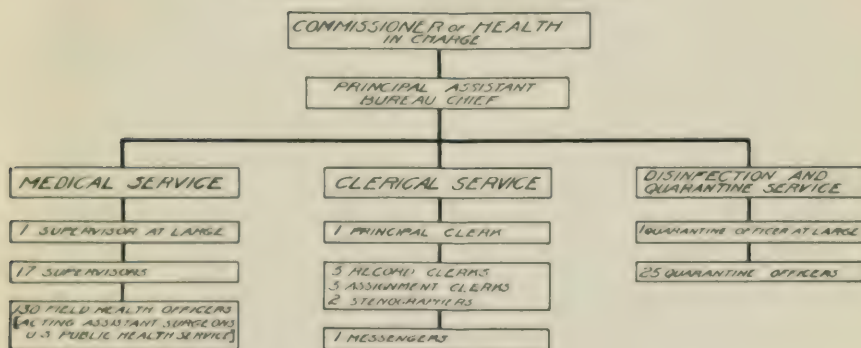


CHART XXII.

In addition to the above the contagious disease division loaned five female quarantine officers who were graduate nurses and nineteen Municipal Tuberculosis Sanitarium nurses doing quarantine work, to the Visiting Nurse Association for emergency nursing service.

The clerical work entailed by the field work of the Health Department was so heavy for two or three weeks that the majority of the office forces at the central office of the Municipal Tuberculosis Sanitarium was turned over to the Health Department to assist in recording and assigning the large volume of work.

Supervisors. Each supervisor in addition to being made responsible for the work of employees under him and for conditions in his district was required:

(1) To give certain definite assignments to his field force.

(2) To visit each hospital in his district once each week to see that influenza cases are properly isolated as far as possible on one floor, that attendants and visitors, when admitted, are wearing gauze face masks; also make a report on number of influenza cases and on number of empty beds, by actual count, in each hospital.

(3) To visit all factories and other places where large numbers of persons are employed to interest the management and secure the co-operation of same in all measures that are active in preventing influenza, especially in the following:

(a) Each foreman or manager to have a sick call each morning and any employe having symptoms suggestive of influenza to be sent to the company physician if they have one, and if not, to his home and advised to call a physician.

(b) He shall also secure the co-operation of any unit for social or nursing welfare which the firm may have.

(c) He shall leave a circular of information, the educational placard and other matter with the management of each firm visited.

Acting Assistant Surgeons in U. S. Public Health Service Assigned to the Department of Health. The requirements called for an average of four hours per work day and a minimum average of twenty calls per work day. In the better neighborhoods where need of medical aid and survey work was less urgent, owing to an insufficient number of trained medical health officers to man all districts we gave two districts to one employe. It was only in this way that the 180 districts could be manned with the 130 medical men provided for this work. The duties of these forces working in the field were three-fold—(1) medical aid service; (2) house-to-house survey service; (3) inspection service.

(1) Medical aid service was rendered by these employes when given emergency assignments through the Department of Health, at the request of family, nurse, neighbor, et al. If a case of influenza was found without a physician in attendance the following action was taken:

(a) Isolation of patient, instructions to attendant and family as to quarantine, notification of schools and usual reports to the Department of Health.

(b) The family shall be informed as to the serious nature of this disease and shall be urged to call their physician at once, if they can afford to employ a physician. Pending the arrival of the physician the health officer shall render all necessary medical care to the patient.

The health officer shall return the following day to make sure that a physician has been obtained and if no physician is yet in attendance shall continue to treat the case until the patient is recovered or case terminated unless a physician is obtained.

(c) Where the family state that they cannot afford to employ a physician the health officer will be charged with the treatment and medical care of the case until terminated or until he obtains a county agent physician or a municipal tuberculosis dispensary physician to treat the case. If nursing care cannot be furnished by members of the family or relatives the

health officer shall at once telephone the Red Cross nursing service requesting that nursing care be furnished if possible.

(d) If medical care is furnished by the health officer he shall indicate this fact on his inspection report.

Subsequent calls on a given case shall be reported on miscellaneous form H. D. M. 552, indicating clearly under "Remarks" the nature of the services rendered.

In addition to the 1,475 visits made by the acting assistant surgeons in the U. S. Public Health Service, for the purpose of giving medical relief the contagious disease division of the Health Department transmitted to the eight Municipal Tuberculosis Sanitarium dispensaries a total of 861 urgent calls for physicians in families unable to pay for medical services. These and many similar calls from various sources were handled by the sixteen dispensary physicians of the Municipal Sanitarium dispensary service.

(2) **Survey Service:** The field health officer made a house-to-house canvass in the district assigned him by his supervisor, systematically visiting each family in a search for unreported or unrecognized cases of influenza and illness. Cases of influenza found were reported to the Department of Health and the usual quarantine, isolation, notification and reports made.

During this survey work the health officer treated any cases of influenza found until recovered, unless a physician was employed. He also obtained if possible, nursing care for the patient if needed. Also took necessary steps to correct insanitary conditions encountered. A total of 49,078 visits was made in connection with this survey work.

(3) **Inspection Service:** This service was planned with the idea that a visit to a family early in the disease and careful instructions in the following items might prevent subsequent cases in the family, etc. The field health officer was instructed to cover the following points:

(a) See that the case is properly isolated.

(b) See that all discharges from the nose and throat of the patient are properly collected and destroyed by burning.

(c) See that the attendant is at all times "masked" when in the patient's room. All members of the family should wear the face mask for their own protection while at home.

(d) Milk bottles shall not be taken into the patient's room and must be boiled by the family before returning to the milkman.

(e) The attendant shall be instructed to carefully wash his hands each time after rendering any service to the patient.

(f) Members of family other than the attendant, are not to enter the patient's room.

(g) School teachers and children of a family with this disease are not allowed to attend school and must be kept on the premises. School teachers who change their address and show no symptoms after a period of five days may return to school.

(h) School teachers and children who have had the disease are to be examined by the school health officer before being readmitted.

(i) Health officer must instruct the parent or guardian that no teacher or pupil will be admitted to school until at least eight days have elapsed from the definite date of onset and until the patient is free from sneezing, discharging nose, cough, sore throat, etc.

(j) No patient shall attend any place of public assembly or use public conveyance until he is fully recovered as outlined in (i).

(k) Health officer will leave a circular of information on influenza in that language which the family can read understandingly.

(l) Health officer will mail a postal card notification to the principal of the school where there is a pupil in the family afflicted with influenza; if the patient is a school teacher or pupil the definite date of onset shall be given on postal card notification.

(m) Premises shall not be placarded unless the family refuse to comply with above requirements. When the health officer cannot get the family to comply he shall post the red placard on front and rear doors of premises occupied by the family, where a case of this disease exists.

A total of 11,298 visits was made in connection with this inspection service. In these total visits are included a few investigation and quarantine calls.

In addition to the medical relief, survey and inspection service a large number of visits for quarantine supervision, lax quarantine complaints and disinfection in connection with the influenza and pneumonia work were made by the regular Health Department quarantine force still remaining after the available physicians and nurses of this force had been merged with the specially organized field force.

The U. S. Public Health Service detailed four *full time* acting assistant surgeons, each of whom averaged over thirty calls per day during the period of their employment. Each of these was given two or more sub-districts.

Besides the large number of influenza circulars and educational placards distributed by this field force engaged in influenza work the Red Cross furnished approximately 43,000 gauze masks for distribution by the field forces.

Co-operating Agencies. Prior to the assignment through the federal government of the acting assistant surgeons to the Health Department, the health commissioner, who is also president of the board of trustees of the Municipal Tuberculosis Sanitarium, had ordered that the eight Municipal Tuberculosis Sanitarium dispensaries, well located in the several sections of Chicago, should remain open night and day, Sundays and holidays, to serve as relief stations for influenza aid. An ample supply of gauze masks, blankets, pneumonia jackets, etc., was obtained and kept there for emergency use and distribution.

The two dispensary physicians at each of the eight Municipal Tuberculosis Sanitarium dispensaries were assigned to give their full time to furnishing medical relief service in their districts.

Many of the field health officers who did not accept the special influenza work under the U. S. Public Health Service, promptly responded willingly when they were requested to help in an emergency late at night for medical relief service.

Results Accomplished. It is difficult or impossible to estimate the results of this medical field work. It was valuable, however, in accomplishing the following results:

(a) All sick persons received medical care promptly after the request was received at the Health Department, even late at night.

(b) The survey work uncovered many cases of influenza without medical care, where the services of a physician were needed.

No way exists for accurately measuring the amount of infection of attendants, members of family and the public generally that was prevented through the isolation of patients, use of gauze masks and other precautions for the members of the family and the improved quarantine through these efforts.

Demobilization of the medical forces was gradual. The positions of six or eight health officers who left the service just prior to November 5, 1918, on military leave or for other reasons, were not filled as the epidemic was decreasing rapidly at that time. On the evening of November 9, the epidemic having waned, the special field work as organized jointly with the U. S. Public Health Service was discontinued. The Health Department health officers were laid off from the government service, but were continued by the city at their regular pay and part time service for school inspection and district medical inspection work.

NURSING SERVICE AND RELIEF WORK.

Under the direct supervision of Surgeon General Rupert Blue of the United States Public Health Service, Dr. J. O. Cobb, senior surgeon of the Public Health Service, in charge of the Marine Hospital at Chicago, was selected to direct all activities in connection with influenza relief work and to oversee the disbursement of the Illinois portion of the appropriation available for this purpose. Dr. Cobb in this capacity cooperated with Dr. C. St. Clair Drake, director of the Illinois State Department of Public Health, the commissioner of health of Chicago and with the local chapter of the American Red Cross in carrying out the various measures for relief, including nursing service, home care, food, medical and miscellaneous supplies.

At a meeting in the health commissioner's office, with various nursing organizations, specific plans were formulated for giving extensive nursing service and relief work in needy homes wherever influenza and its attendant disease, pneumonia, appeared. This was accomplished by redistricting the city and assigning additional nurses from the Health Department, Municipal Tuberculosis Sanitarium and Red Cross to supplement the work of the Visiting Nurse Association, which organization was then almost overwhelmed by calls for nurses and assistance in the homes of the poor.

Splendid and effective work was done by various other associations working either independently or with the Visiting Nurse Association. In the accompanying table is shown how these various organizations of trained nurses, practical nurses, workers (volunteer and paid) and aids, gotten together hurriedly and combined under one effective working head, covered an extremely large number of cases and accomplished an immense amount of relief work among those stricken with the disease.

Table XXIII.
HOME NURSING SERVICE.

Agencies	Trained Nurses	Practical Nurses	Pts. cared for	Total Calls
Visiting Nurse Association	84	28	8,235	25,978
Municipal Tubercu- losis Sanitarium	74		2,738	12,833
Health Department Field Nurses	110			29,996
Infant Welfare Stations	28		4,238	

Never was the demand for nurses and nurses' aids greater and never was the shortage of good workers felt more keenly than during the recent epidemic. The biggest need for assistance found by the various organizations working in the field was the necessity for practical housekeepers to stay day and night with families where all the members were stricken with the disease and where the neighbors were afraid to render assistance. Such work was done principally by volunteer aids who would go in for perhaps a day or a night and often relieve one another if the case called for continuous service. Wherever possible all this work was done under the direct supervision of one of the nursing organizations.

The necessary relief work was done by the organizations already in the field. The county physicians of the county agent's office from October 1 to November 20, treated 1,332 persons in their homes suffering from influenza and sent 272 patients to the Cook County Hospital. A total of 2,360 influenza and pneumonia cases were admitted to the County Hospital between September 18 and November 21.

The United Charities cared for 600 families with a total of 1,500 persons afflicted with the disease. This organization had from 85 to 100 workers in the field and during the epidemic made 2,500 calls on families suffering from the disease.

The American Red Cross cared for 1,030 families. The material aid given was principally food to families where there was need for the same. The dietetics department furnished nourishing soups and foods to families where the mother of the home was ill and could not prepare the necessary nourishment.

Fifty graduate nurses volunteered their assistance and with the exception of three, were engaged and paid by this organization. They also made a special effort to get volunteer aids. The services of 297 were procured. Efforts were also put forth to enlist "practical nurses" in the work.

The Elizabeth McCormick Memorial Fund, learning that the Visiting Nurse Association was overworked, made an

effort to supply motors for the nurses doing the field work. In response to a call for volunteers thirty men and women, driving their own cars, gave their services and machines were sent twice a day to some of the dispensaries during a period of about two weeks when the epidemic was at its height. Some of these volunteer drivers also assisted in the delivery of food.

The services of about fifteen women were also secured who were sent directly to the homes of influenza sufferers and assisted in preparing food and in cleaning and straightening rooms wherever necessary.

The Infant Welfare Society, as an emergency measure, gave nursing care to all members of families afflicted with influenza in those families where they had registered infant welfare station babies. In this way they gave care to some 4,238 families, thus relieving those associations which bore the heaviest part of the work during the epidemic. Their entire staff was engaged in the work and all calls for housekeepers and emergency nurses were turned over to the Red Cross Teaching Center, where they were immediately supplied.

The Jewish Aid Society of Chicago gave whatever relief they could to the families in which there was sickness. With fourteen field workers on the staff, including a trained nurse, the society worked in co-operation with the West Side Dispensary, giving bedside care in such cases where the conditions demanded special care. It was found necessary in many cases to prepare cooked foods, mostly soups and cereals, and to carry it to those families where there was no one in condition to supply the family with nourishment. In a number of cases trained and practical nurses were furnished at the society's expense.

The rules under which the schools were kept open placed additional work on the school nurse. In the systematic check-up on absentees, each one of the Health Department field nurses, 110 in number, received a list daily of absent children in her district, together with the names and addresses of families where illness had been reported.

In this work the nurses made 29,996 calls; referred 1,860 suspected influenza cases to the Health Department; 767 to private physicians; 76 to the Visiting Nurse Association and 58 to hospitals. They also referred 36 families for relief to the United Charities and 70 to the County Agent.

HOSPITALIZATION AND HOSPITAL CONTROL.

Hospitalization. Hospitalization of as many influenza cases as possible during the epidemic was recognized early

as being almost a necessity, since this procedure enabled a maximum number of cases to be cared for with a minimum nursing force. To provide hospital facilities for influenza patients the responsible managing officer of all hospitals was asked to give such patients the preference over all surgical and other cases not of an emergency nature. Added ambulance facilities were provided by the Police Department and Health Department to transfer influenza cases to the hospital. Many Chicago hospitals showed a commendable spirit of co-operation by setting aside a number of beds for patients unable to pay for hospital care. By this arrangement the ambulance was able to take the poor patient to the nearest available hospital, often obviating a long haul to the Cook County Hospital.

Hospital Control. Early in the campaign against influenza the commissioner of health, through the section of hospital control in the contagious disease division of the bureau of medical inspection, had each hospital notified by telephone, that influenza cases must be isolated on one floor as far as possible and that the attendant must wear masks. Visiting in hospitals was advised against. This action was taken for the purpose of protecting the sick confined in hospitals against introduction of infection through visitors; also for safeguarding persons visiting hospitals where influenza patients are being treated. At a later date the State Department of Public Health issued an order reading as follows:

"Whenever influenza is epidemic or threatens to become epidemic in the community, visitors shall be excluded from hospitals, asylums and other similar institutions, except in cases of actual emergency, such as impending death, and shall be admitted then only when every precaution is taken to protect the patient, attendants and other inmates of the hospital, the visitor and the public."

This order was made the basis of the following instructions to hospitals by the Chicago Health Department:

"October 5, 1918.

To Superintendents of Hospitals:

After reading the accompanying order of the State Department of Public Health, I took the matter up with Dr. Drake personally. He stated to me that that part of the order which says that visitors are to be permitted only in case of emergency should be construed to mean that where, in the judgment of the superintendent or manager of a hospital, an absolute emergency exists, such as impending death, extreme nervousness of patient preceding or following surgical

operation, or similar conditions, the visit of a close relative of patient may be permitted.

The Department of Health of the City of Chicago requires that the influenza cases now in your institution should be, as nearly as possible, all isolated on one floor, and, where practicable, a separate nursing and interne service should be established.

Every precaution should be taken to prevent nurses and others from bringing influenza infection to the patients. In cases where it is absolutely necessary for some close relative to see the patient this relative should be taken into the room with a face mask on, thus minimizing the danger of influenza infection.

I want to bespeak your continued co-operation with the Department of Health. It is my judgment that you should not refuse to admit influenza and pneumonia patients, to the limit of the capacity of your nursing service.

If we all pull together in this matter, this epidemic will be quickly stamped out, and the hospitals then can resume their regular procedure.

(Signed) JOHN DILL ROBERTSON,
Commissioner of Health."

A few days later each hospital was visited and a report obtained covering these points:

- (1) Bed capacity of hospital.
- (2) Number of patients in hospital.
- (3) Number of patients with influenza and pneumonia.
- (4) Number of empty beds.
- (5) If influenza in hospital:
 - (a) Are cases isolated on one floor?
 - (b) Do attendants wear masks?
 - (c) Is mask of proper mesh and thickness?

Hospital Facilities: Early in the epidemic there was a wide-spread impression that the Chicago hospitals had reached their maximum capacity and that they would be unable to accommodate influenza patients needing hospital care and able to pay for the same.

In order to determine the exact situation in reference to available beds all hospitals were visited from time to time by employes of the Department of Health.

The first summary of this survey for sixty-three hospitals showed a total of 7190 patients in hospitals, 803 of whom were

cases of influenza. This survey showed 1675 empty beds. All these hospitals had influenza cases isolated and all but three had attendants wearing masks. These three promised to comply. This survey revealed plenty of hospital beds for influenza. At a later date a survey showed the hospitals were not utilizing their available space for influenza and to correct this condition the commissioner of health called the superintendents and managers of hospitals to a conference at the council chambers for the purpose of getting better co-operation. The hospital representatives present were told they must use all available space for the care of influenza patients or else drastic measures would be used. This conference showed that the situation in part was due to their inability to provide nurses, this making it impossible for them to accept patients for the empty beds. A later survey of fifteen of the smaller hospitals with a bed capacity of 1754 showed 292 empty beds some of which however, were not available because 99 nurses were off duty in these hospitals on account of illness.

A partial survey of hospitals on October 19, near the peak of the epidemic, gave information that there were plenty of empty beds and yet others that could be made available if only sufficient nurses could be procured.

The hospital survey made from time to time indicated that at no time during the epidemic was there a lack of bed space or of medical facilities, but the one handicap was the insufficient supply of nurses.

CLOSING OF THEATERS, DANCE HALLS AND PROHIBITION OF OTHER GATHERINGS AND OVERCROWDING.

Among other measures of precaution, such as establishing another anti-spitting crusade and prohibiting coughing and sneezing in public places the Moving Picture Exhibitors League co-operating with the Chicago Health Department had lantern slides made and posters printed (see appendix C.) warning against spitting and uncovered coughing and sneezing in public places. On October 5, 1918 the the sanitary bureau distributed these slides to the various moving picture theaters to be projected on the screen at each performance, thus bringing to the attention of the public in a very forceful manner the necessity of protecting themselves and their neighbors from influenza infection. The posters were required to be posted in a conspicuous place near the entrance.

On October 11, 1918, letters were mailed to all theater owners soliciting their co-operation in disseminating useful knowledge for the prevention of influenza and other acute respiratory diseases and calling their attention to the distinct

menace to public health of insanitary and improperly heated and poorly ventilated theaters.

The theater managers were urged to earnestly co-operate with the bureau of sanitation in carrying out the following requirements:

- (1) Keeping theaters scrupulously clean by daily sweeping and scrubbing of floors and sprinkling of same with disinfecting solution before each performance; by maintaining thoroughly clean and dry basements or cellars.
- (2) Keeping ducts, fan, motors, heaters and all parts of ventilating equipment clean and free from dust or dirt; and having system in constant operation during every performance.
- (3) Prohibiting coughing or sneezing without covering the nose or mouth with a handkerchief and requesting patrons failing to observe this rule to leave the theater; placing under arrest any person caught expectorating on the floors.

The managers were warned that those neglecting to comply with these regulations and thus failing to maintain healthful conditions in the buildings would be penalized by having their theaters summarily closed without further notice. With but very few exceptions the orders were cheerfully complied with.

Simultaneously orders were issued to prohibit overcrowding in all places of amusement. Dance halls were ordered closed on the 12th of October. This was deemed necessary on account of the close contact during dancing and the danger of exposure to cold after becoming fatigued in an overheated and poorly ventilated hall.

On October 15 an order was issued closing all theaters, skating rinks, moving picture shows, night schools and lodge halls. (See appendix D).

On October 18, the order was extended to include all public gatherings not essential to the war, such as banquets, conventions, lectures, social affairs and athletic contests of a public nature. On this day music, cabarets and other entertainments in restaurants and cafes was stopped and crowding prohibited in poolrooms, saloons, etc. (See appendix E).

The crowding on public streets and public places incident to the Fourth Liberty Loan drive, which continued during the three weeks preceding October 19, was not interfered with. On October 12 a large parade was held in the central business district which brought together large crowds of spectators.

STREET CAR SANITATION.

Since the street car system of Chicago has been operated under the ordinance of 1907, a fair degree of satisfaction has been had with respect to some of the most essential elements of street car sanitation. Certain minimum standards with respect to ventilation and heating are required by the terms of this ordinance, which also provides for the maintenance of the cars in a clean condition. The increasing vigilance of the department, especially during the past two years, has resulted in obtaining a fairly uniform compliance with these requirements.

In the fall of 1915 the Chicago Surface Lines entered into an agreement with the Department of Health to provide the best possible ventilation for all new cars and improve the ventilation of the cars then in service, as well as to increase the capacity of the heaters so as to maintain the temperature required by the ordinance. Since that date thermostats have been installed in all cars, set to maintain the minimum temperature required under the terms of this agreement. Space is donated for the display of Healthgrams and other educational matter furnished by the department. Nevertheless, an acute problem is presented by the overcrowding that exists during rush hours. In this city smoking has heretofore been permitted in the front vestibule of street cars, as well as in special smoking cars on three of the four great divisions of the elevated system.

When the various repressive measures were taken in rapid succession against the influenza epidemic, it was obvious at once that the car service could not be suspended. Chicago covers an area of nearly two hundred square miles and is a "city of magnificent distances." However, steps were taken at once to insure an extraordinary circulation of fresh air in the cars, to prohibit smoking and the concomitant expectoration, to warn against uncovered coughing and sneezing and to minimize crowding during the peak hours.

In line with this policy, letters were addressed to the presidents of the Chicago Surface Lines and Chicago Elevated Railways on September 30, promulgating an order "to thoroughly clean, renovate and disinfect all cars and public conveyances at least once in every twenty-four hours." The sanitary bureau of the Health Department was also directed to see that this order was strictly enforced. Observation soon showed that, owing to the general labor shortage, the companies had some difficulty in keeping their car cleaning crews filled and were forced to employ women for this work which had to be done largely at night. Visits were

made night and day by inspectors of the Department to the various terminals and car barns where the cleaning was done and the suggestions of the inspectors were from time to time embodied in letters to the officials of the companies, who responded with renewed promises of co-operation.

On October 13 an order was issued prohibiting smoking on all public conveyances operating within the city. This order was posted in all cars and violators were threatened with arrest and fine. At the request of the commissioner of health similar action was taken by the regional director of railroads, as a result of which smoking cars were removed from suburban trains on October 18.

In order to assure a better circulation of air in the street cars, it was decided that open communication should be maintained between the front vestibule and the rest of the car. To supervise the observance of these regulations a force of sanitary inspectors was detailed on October 17 to "make observations on street cars in operation, to determine if the requirements imposed by the department and the observance promised by the street car companies are being carried out. The inspector will be stationed on a line entering the loop and will observe if the front vestibule is open to the rest of the car, and, if any smoking is found, he will caution the conductor and the smoker that this is in violation of the requirements. He will note if the air circulation in the car is good and, so far as the weather permits, will see in addition that windows are open if practicable. He will also report on the general condition of cleanliness of the car, especially the floor."

A study of their reports soon showed that conductors and motormen experienced difficulty with passengers in carrying out these regulations. Signs were then posted near the vestibule doors, bearing the legend "This door must be kept open." Some passengers complained of draughts and insisted on closing the doors, so that on October 21 it became necessary for the department to request the management to fasten one of the doors between the vestibule and the body of the car in an open position. This was done by means of strips of wood nailed to the floor.

Car crews were instructed to request the assistance of the police when a recalcitrant passenger persisted in smoking after being cautioned against it, and in a few days smoking on public conveyances was a thing of the past.

In order to reduce overcrowding to some degree, a request was addressed to the public, through the press, that as many as possible indulge in the healthful exercise of walk-

ing to and from work, or at least a part of the distance. Large places of employment were requested to arrange their working hours so that it was not necessary for all their employes to enter and leave the downtown district at the same time and a notice to this effect was posted in all large office buildings, commercial and industrial establishments. It was felt that this distribution or "staggering" of load would reduce overcrowding to some extent and thereby help to lessen the danger of infection from the too close contact of persons in public conveyances.

Notwithstanding these measures, it was found that overcrowding still prevailed, and on October 24 a force of inspectors from the Health Department, in co-operation with investigators from the Department of Public Service of the city, was instructed to investigate the car barns during the rush hours on a given day, to determine if street cars were allowed to remain idle during these rush hours. An apparently unnecessarily large number of cars was found in the barns, but the company officials explained that this was due to their bad repair and the difficulty of maintaining a force sufficient to keep them all in service.

CHURCHES AND SCHOOLS ALLOWED TO CONTINUE.

While it may be accepted as axiomatic that the temporary suspension of all travel, as well as social and commercial intercourse, would cause any epidemic of a crowd disease to subside or disappear in the course of a few days, it is obvious that this ideal of quarantine is chimerical and impossible of realization in the complicated life of a modern city.

In the early days of October, when the influenza wave in Chicago was rapidly ascending, it was decided to prevent, as far as possible, all unnecessary contact of persons, but the extent of this policy was limited by practical considerations. It also seemed desirable to discourage the late hours kept by most adults, and much publicity was given by the public press to the appeals issued by the commissioner of health that the people retire early and get as much rest as possible. Thus, when it was decided to close certain places of assemblage, including night schools, lodge halls, theaters and other places of amusement, a two fold object was held in view—the prevention of unnecessary contact between individuals and the discouragement of late hours. Some thought that consistency demanded the closing of schools and churches, but while restrictions were placed upon them, it was decided for various reasons to allow day sessions and regular services in these two classes of institutions respectively.

It was calculated that the absolute closing of all houses of worship would seriously impair the popular morale and result in deprivation of the spiritual comfort deemed so essential in the heartrending times of war, plague and pestilence.

The churches showed commendable public spirit in the adoption of measures co-operative with the public health authorities. Archbishop Mundelein issued regulations (See appendix F) on October 17 to the pastors of all the Catholic churches of the archdiocese, which suspended all evening services, missions and long sermons. Masses were limited to 45 minutes, and only 5 minutes were allowed for the scheduled Sunday instruction. Provision was also made for the thorough ventilating of each church between the Masses, and additional ushers were placed in the aisles to request the departure of persons who were observed to be coughing and sneezing.

Similar action was taken by the Protestant churches through the Church Federation Council. Many clergymen substituted the subject of the epidemic for their regular texts and nearly all wove the healing powers of fresh air and sunshine into the theme of their regular sermons.

Random observations of conditions with respect to temperatures, ventilation, cleanliness and crowding were made during the period of an entire service in various churches by inspectors from the sanitary bureau and the reports received were favorable in most cases. In many cases it was noted that the preachers cautioned those present against unmuffled coughing and sneezing, very little of which was observed by the inspectors.

With respect to the schools, it was remembered that the sanitation is quite uniformly good and that the hygienic conditions of environment were better than those which would have obtained among the children if the classes were discontinued. When in school, the children are under the observation of physicians, nurses and teachers, while on the outside there is no limit to their possible contact under conditions in which this supervision is lacking.

Statistics of influenza epidemics show that adults, especially those between the ages of 20 and 40, are more susceptible than children of school age. Therefore, it seems more necessary to adopt defensive measures for the protection of adults than for children, who are usually the susceptible ones in other epidemics.

It seems that the experience of other large cities in which the influenza rate was higher than in Chicago, and in most of which the schools were closed, does not show that this

action gave them any advantage over Chicago, where the schools were not closed.

INFLUENZA IN THE LODGING HOUSES.

At the very beginning of the influenza epidemic in Chicago every lodging house and hotel, about two hundred in number, was being inspected daily by a health officer from the Health Department. The hotels and lodging houses were also inspected by officers from the State Department of Health, who turned over daily to the city officials lists of influenza cases which they found, over 500 in all. These were inspected, quarantined, treated or sent to hospitals.

The average daily population of the lodging houses during the period of the epidemic was about 10,000 and from among this number 900 cases of influenza were reported. Over 100 cases of influenza and pneumonia were sent to the County and St. Luke's Hospitals. Of these 38 died. Two hundred forty cases of mild influenza were treated in the lodging houses by the health officers and private physicians. Eight hundred were vaccinated with the Rosenow vaccine. In most instances only one dose of vaccine was given. During the height of the epidemic many lodging houses and large rooming houses on West Madison, Clark, State, Wells Streets and Wabash Avenue were visited twice daily and the managers co-operated with the Health Department in keeping windows open, fumigating rooms that had been occupied by influenza patients and by giving lists of sick guests.

Every saloon and pool room in the lodging house district was visited and the keepers instructed to open the windows and doors, to keep the place sanitary and not allow crowds to gather.

CO-OPERATION WITH THE POLICE DEPARTMENT.

Throughout the entire course of the epidemic the Police Department had to be called upon continuously to carry out the various measures resorted to by the Health Department to restrict the spread of the disease. Mr. John Alcock, acting superintendent of police, was in daily conference with the health commissioner and responded to all demands for assistance cheerfully and promptly.

When the epidemic first threatened to visit the city the Police Department was called upon to start another vigorous antispitting crusade. Patrolmen also enforced the order prohibiting uncovered coughing and sneezing in public places.

Later when the various closing and anticrowding orders

were issued the superintendent of police had to be relied upon for their strict enforcement. The same thing applied also to the order limiting the attendance at all funerals to ten persons. The police force made a special campaign to stop overcrowding in saloons and pool rooms.

The ambulance bureau of the Police Department was constantly called upon for assistance. The Health Department secured some additional ambulance surgeons for this service which were urgently needed to supplement their regular forces. The service was taxed to its utmost during the peak of the outbreak but by a plan of co-operation it was possible to facilitate the hospitalization, by removing patients as far as practicable, to the nearest hospital. To this end the ambulance bureau was supplied with a list each day showing the vacant beds available for influenza patients in the various hospitals of the city.

EFFECT OF CLOSING ON CRIME AND VICE.

Rev. J. P. Brushingham, secretary of the Morals Commission, reports that the result of investigations made by the Morals Commission of Chicago showed that there was a decided falling off in vice and crime during the time when restrictions were placed upon public amusements, dance halls and assemblies of various kinds during the influenza epidemic. The morals court schedules from October 19 to November 6, 1918, the period of the shut-down, listed but 392 cases as compared with the corresponding period of 1917, when there were 693 cases. This represents an actual decrease of 301, or 43.5 per cent. So far as vicious conduct and immorality are concerned it would seem that "to keep the home fires burning" and to stay off the streets late at night lessen the number of misdemeanors and misconduct of every kind.

The diminution of complaints received by the police department during the period when the ban was on amusements and public gatherings, while not so pronounced as the lesser number of cases brought into the morals court, nevertheless shows a marked and gratifying improvement. The complaints of crime in the police courts, including petty larceny, holdups, robbery and in fact the whole catalog of criminal offenses, during the influenza period of 1918 totaled 417. During a corresponding period of the previous year there were 671 such complaints. The falling off in the actual number of crimes as shown by these statistics represents a reduction of approximately 35 per cent. during the period of the shut-down.

CLEANING THE STREETS AND ALLEYS.

An extraordinary effort was made to clean up the city when influenza threatened to become epidemic. In this clean-up campaign it was natural that the bureau of streets should perform a considerable amount of the work entailed and should make rather extraordinary efforts to obtain the results desired. The forces of this bureau were inadequate on account of insufficient appropriations and were depleted by war service and later by the epidemic itself. Extra forces, however, were secured and the streets and alleys were cleaned daily in the more congested districts, such as the 10th, 11th, 14th, 16th, 17th, 18th and 19th wards. Streets were flushed daily, four large power flushers working sixteen hours a day being employed in addition to the flushing done by the Fire Department. Alleys which have been given a bi-weekly or tri-weekly cleaning, having the ashes and garbage removed, were cleaned every day. This activity continued for one month.

It is greatly to be regretted that such service can not be given at all times. If the entire city were cleaned as these districts were during this period the dust nuisance in Chicago would entirely disappear. Dust is at best a nuisance; it also is a carrier of infection and infection means illness and loss of revenue to the wage earners. It would, therefore, seem that as a matter of good business, money should be spent liberally in providing the means to abate the dust nuisance. This will not happen until an aroused public opinion brings home the importance of providing the necessary means.

During the course of the epidemic the assistance of the Fire Department was secured in the flushing of the streets. Firemen did this work at night with a fire hose. In this way every paved street within the territories of the respective fire companies was flushed at least once. In the more congested districts, where the territory covered by the fire company was relatively small, the streets were flushed two or three times. Continued flushing of the streets was rendered unnecessary by a heavy rain which occurred in the latter part of the month.

PROTECTION OF MILK AND FOOD SUPPLY.

In September when it appeared certain there would be an epidemic in Chicago the bureau of food inspection dispatched the entire force of country dairy inspectors to pasteurizing, bottling and creamery plants in the country districts furnishing Chicago's milk supply, namely, northwestern Indiana, northern Illinois, western Michigan and southern

Wisconsin, with instructions to direct the raising of the temperature of pasteurization to 145° F. and hold the same at this point constantly for thirty minutes, instead of 140° F. held for 20 minutes which is the usual requirement.

In addition the co-operation of local health officers in the dairy district was obtained in excluding from various plants any workers suffering or suspected of suffering from influenza. A physician's certificate was required from suspected patients before returning to work. Three hundred nineteen suspected cases of influenza were investigated.

Similar precautions were taken in Chicago. Whenever actual or suspected cases of the disease were found in milk depots or on premises closely connected with the same they were either excluded from the premises or the milk received there was required to be handled elsewhere. Special inquiries were continuously made in regard to the occurrence of the disease among milk delivery wagon drivers and many firms instituted a daily medical inspection of such workers.

Consideration was given early to the possible spreading of influenza through contact with drinking glasses, dishes, knives, forks, etc., in public eating places. Hence about fifty food inspectors were assigned to inspect all restaurants and especially those in the heart of the city. Inspectors were given instructions to dismiss all employes having symptoms of the disease in any way connected with the handling of foods, to order all restaurant keepers to thoroughly wash and sterilize all eating utensils after being used by patrons and particularly to refrain from supplying used napkins for wiping dishes and other utensils. Frequent inspections were made of all the restaurants including those having automatic sterilizers with the result that the orders were substantially complied with.

All down town ice cream and soda dispensing establishments were visited with explicit instructions to sterilize the glasses, dishes, spoons, etc., after using and in the absence of proper facilities the manager was instructed to use paper cups as a substitute.

PUBLIC FUNERALS PROHIBITED.

Public funerals of persons dying of influenza and from pneumonia complicating influenza were prohibited as soon as it became evident that the local outbreak of influenza would assume epidemic proportions.

This action was taken not on account of fear of spreading the disease by properly embalmed bodies but because of the danger of unrecognized mild or convalescent cases in the

families of deceased persons mingling with the mourners. An additional reason was the danger of infection by congregating on the premises where the disease had occurred and in carriages and chapels used promiscuously for such funeral services.

On October 12 a ban was placed on all public funerals. Attendance was limited to ten persons exclusive of the clergyman and the undertaker and burial in all instances was required to proceed from the place of death directly to the cemetery. By agreement flowers were prohibited except at the cemetery. The measures were taken with a two-fold object, primarily to facilitate and economize in burial and incidentally to eliminate another cause of crowds and public gatherings.

A feature which at one time looked quite serious was the possible shortage in caskets. The surplus stock usually carried by factories had been requisitioned by the U. S. Government for army and navy needs and this, together with a material reduction in the factory forces which had been called to the service, no help being available to fill their places, greatly reduced the output. Co-ordination of forces made it possible to solve this difficulty.

The labor organizations of the city without hesitation removed all restrictions against the Sunday labor necessary to meet the emergency during the period of the epidemic. For some time prior to the epidemic there had been no Sunday funerals in Chicago.

There are only one hundred and fifty-nine hearses in the city. These would have been inadequate if the number of deaths occurring daily had increased much over 520, the number reported on October 17, which turned out to be the crest of the wave. Arrangements were, therefore, made with the transportation companies running near the principal cemeteries for special service but fortunately this service did not become necessary.

CO-OPERATION OF THE PEOPLE.

The people of Chicago co-operated splendidly in carrying into effect the measures adopted and advised to lessen the ravages of the disease. Through their various organizations they took an active part in supporting the administrative officers upon whose shoulders rested the burden of protecting the community.

At a meeting of the Presidents' Club called by Mr. Lucius Teter, president of the Association of Commerce, and at

tended by the presidents of 45 large civic and commercial organizations, a sub-committee was appointed consisting of Mr. D. F. Kelly and Mr. C. H. Canby, to co-operate with the Department of Health. The organizations which were represented at this meeting by their presidents included the Association of Commerce, the Board of Trade, the Union League Club, the Chicago Athletic Club, the Hamilton Club, the University Club and the Chicago and Northwestern Universities.

After considering the situation thoroughly and hearing a report from the commissioner of health they voted to co-operate in every way. The sub-committee appointed did signal service in assisting the Department of Health and the Influenza Commission. This action helped to maintain the confidence of the community and to assure the continued co-operation of the commercial and industrial interests. They, also, with the assistance of the bankers of the city, aided in securing the necessary financial support for the manufacture of vaccine.

PROPHYLACTIC VACCINATION.

For the purpose of obtaining guidance in laboratory matters and particularly to secure advice as to the possibilities of prophylactic vaccination against influenza and pneumonia, a laboratory committee consisting of the following members was appointed: Dr. D. J. Davis, Chairman, Dr. Ludvig Hektoen, Dr. A. I. Kendall, Dr. F. Robert Zeit, Dr. George H. Weaver, Dr. J. P. Simonds, Dr. J. J. Moore, Dr. W. Henry Wilson, Dr. John Dill Robertson and Dr. Frederick O. Tonney, Secretary.

Meager reports not altogether favorable had at that time been received with regard to the influenza bacillus vaccine introduced by Leary of Boston and Park of New York City. Reports had just appeared of the successful vaccination against pneumonia at Camp Upton, by means of a lipovaccine containing the three fixed types of pneumococci. Eyre and Lowe²⁰ had reported the results of 2,018 vaccinations with a mixed vaccine composed of the pneumococcus, streptococcus, *B. influenzae*, staphylococcus aureus, micrococcus catarrhalis, bacillus of Friedlander and bacillus septus. They stated that the influenza incidence was reduced from 28.4 per thousand in the unvaccinated to 2 per thousand in the vaccinated.

At this time information reached the Influenza Commission to the effect that a mixed vaccine prepared by Dr. E. C. Rosenow of the Mayo Foundation had been used with apparent success as a prophylactic agent against pneumonia in

20) *Lancet*, Vol. II, No. 4963, Oct. 12, 1918, pg. 484.

Rochester, Minnesota. At the request of the Commission, Dr. Rosenow came to Chicago on October 16 to report his experience in detail. The argument in support of the Rosenow vaccine as it was brought out in the general discussion is stated briefly as follows: However uncertain our knowledge of the primary cause of influenza may be, there is no question as to the identity of the organisms actually concerned in the fatal pneumonias. Necropsy findings show these organisms to be principally the fixed types of pneumococci, group IV pneumococci and allied strains, hemolytic streptococci, staphylococci and occasionally *B. influenzae*. Killed cultures of most of these organisms are known to possess antigenic properties, hence, a mixed vaccine prepared from strains recently isolated may reasonably be expected to exert a protective influence if not against the influenza itself, at least against the fatal secondary complications of the disease. Furthermore, the injection of large doses of organisms which commonly stimulate phagocytosis may through the simple production of leucocytosis temporarily protect against the influenza itself. Dr. Rosenow further reported that on brief practical trial, the vaccine appeared not only to prevent pneumonia but also to reduce the incidence of influenza infection.

The Committee on Vaccines after consideration of the underlying theory and such facts as were obtainable, and being convinced of the harmlessness of the preparation, recommended the use of the Rosenow vaccine as an emergency measure for prophylaxis against the fatal bronchial pneumonias of the present epidemic. In making this recommendation, it was realized that the use of the vaccine was, in a sense, an experiment. It was felt that the extreme necessity then existing was justification for the step. Accordingly, arrangements were made for the production of the vaccine on a large scale in the Bureau of Laboratories, Department of Health, under the direction of Dr. F. O. Tonney, with the collaboration of the Committee on Vaccines. The laboratory facilities were promptly enlarged and large quantities of the vaccine were prepared according to the technic laid down by Rosenow. In all, about 500,000 average doses (1 c.c. each) were manufactured. The vaccine was put up in concentration of approximately five billion organisms per c.c. and was recommended to be given in three doses of .5 c.c, 1 c.c. and 1.5 c.c. respectively, at seven-day intervals.

Laboratory technic: The organisms incorporated into the vaccine were the three fixed types of pneumococci types 1, II and III 30%, group IV pneumococci 30%, hemolytic streptococci 20%, staphylococci 10% and *B. influenzae* 10%. The

cultures used were recently isolated strains preferably obtained from autopsy material. Older cultures were replaced from time to time by freshly isolated strains. The reserve stock of cultures was kept alive on blood agar slants, which after primary incubation were allowed to remain at room temperature.



PHOTOGRAPH I.

Labelling the vials of influenza-pneumonia vaccine.
Bureau of Laboratories, Department of Health.

Culture media: The principal medium used was dextrose broth made according to the following formula: Meat extract (Liebig's) 3 grams. Peptone (Difco) 10 grams. Dextrose 2 grams. Sodium chloride 5 grams. Water to make 1000 c.c. Adjust to a reaction of $+4$ to $+6$. The medium is filtered, autoclaved for twenty minutes, refiltered and autoclaved for one hour at twenty pounds pressure. It is put up in two liter flasks or bottles containing approximately 1500 c.c. The cotton plugs used to stopper the bottles are covered with coarse cheese cloth to prevent cotton fibers getting into the medium. The blood agar is prepared by adding 10% of sterile defibrinated human blood to 2.5% melted agar at 45 to 50°C. The agar is then tubed, slanted and incubated for several days to prove sterility.

Procedure: Inoculations are made into duplicate 100 c.c. flasks of dextrose broth from the stock cultures of each

strain of organism except *B. influenzae*. Heavy inoculations are made, using three or four large loopfuls of growth. In the case of sparse growing streptococci or pneumococci, it is well to add a small piece of sterile marble to the seeding culture to keep down the acidity. Heavier growths will usually be obtained from recently isolated cultures by this method. After incubation for eighteen to twenty-four hours at 37° C. film preparations are made from the seeding flasks and stained by Gram's method. If the organisms are pure a new set of 100 c.c. flasks of broth is planted in duplicate with 5 c.c. quantities of culture for use the following day.

Final broth cultures: Final inoculation of large flasks of broth is then made except in the case of *B. influenzae*, using 10 to 15 c.c. of material from the seeding flasks to each 1500 c.c. flask of broth. The following schedule is used for a daily output of 75 liters:

GUIDE FOR INOCULATING FINAL BROTH CULTURES FROM
SEEDING FLASKS:

		Straips	Flasks	Total flasks
Pneumococci fixed types.....	30%			
Type I		2	41	= 15
Type II		2	61	
Type III		3	51	
Pneumococci group IV.....	30%	2-15	15	= 15
Streptococci	20%	3-5	5x2	= 10
<i>B. Influenzae</i>	10%	2-5	5	= 10
Staphylococci	10%	2	2 1/2 x 2 1/2	
Lot No.				
Date planted				
Date centrifuged				
		Straips	Flasks	Flasks killed whole
Pneumococci				
Type I				
Type II				
Type III				
Pneumococci, group IV				
Streptococci				
<i>B. Influenzae</i>				
Staphylococci				

The above cultures are incubated for eighteen to twenty-four hours at 37° C. At the end of this time, film preparations are stained by Gram's method to determine purity.

B. influenzae cultures: Forty-eight hour growths of influenza bacilli on blood agar slants are washed with salt so-

*Staphylococci grow in broth culture to about twice the concentration of the other organisms. One half the indicated number of flasks is therefore used.

lution direct from the surface of the slants to 1500 c.c. flasks of broth, using the entire growth of one slant for each flask. To each 1500 c.c. flask of the broth are added 10 c.c. of a 1-10 dilution of hemolyzed human blood. The blood is hemolyzed by drawing one part of blood direct from the vein into nine parts of sterile distilled water. The influenza organisms are then grown for twenty-four hours at 37°C. At the end of this time film preparations



PHOTOGRAPH II.

Separating the organisms from the broth cultures by high speed centrifuge, rotating at the rate of 40,000 R. P. M. Bureau of Laboratories, Department of Health.

should show a few sparse growing influenza bacilli. From flasks showing such growths, new flasks are inoculated with 10 to 15 c.c. of material for the next batch, and then to the 24 hour old cultures, 5 to 10 c.c. of a group IV pneumococcus culture are added to each flask from one of the seeding cultures. This symbiotic culture is now grown for 24 hours longer at 37°C. and usually yields a good growth of influenza bacilli. After final incubation, Gram's stains are made to determine purity and the proper number of flasks are matched with the other cultures according to the schedule previously shown. From the entire lot of cultures, one flask of influenza

bacilli and one flask of hemolytic streptococci are set aside for killing in the whole broth culture. The remainder are now ready for centrifuging. The centrifuging is carried out in a Sharpless super-centrifuge, capable of 40,000 revolutions per minute. In this instrument, which operates on the principle of a cream separator, 75 liters of broth culture may be run through in about one hour.

To remove bacterial sediment: Lift the cylinder out of the machine, using rubber gloves. Flame the metal parts as may be necessary. Stopper the three small openings in the top and one opening at the bottom of the cylinder with sterile corks. Hold the cylinder over a large metal tub while working to catch the droppings. Flame the wrench and open the bottom of the cylinder, holding it upside down. Pour in sterile glass beads or steel balls and 100 c.c. of sterile salt solution. Replace the base and shake thoroughly. Remove one small stopper from the top and shake the contents by tapping the opposite end into a sterile graduated 1-liter cylinder. Repeat the process several times until the bacterial sediment is completely removed. This usually requires from 700 to 800 c.c. of salt solution. Pour the emulsion into a sterile flask and rinse the glass cylinder with enough salt solution to bring the total quantity up to 1 liter.

Killing the organisms: Add 1.5% of purified cresols to the emulsion and allow it to stand at room temperature with frequent shaking. At the same time, add .5% of cresol to the two whole broth cultures of streptococci and B. influenzae. After 24 hours' exposure to the germicide, make sterility tests by inoculation of 100 c.c. broth cultures with three loopfuls of the emulsion; also two blood agar slants, one inoculated directly, and the other a sub-culture inoculated from the first tube. If the concentrated emulsion is sterile after 24 hours' incubation of the cultures, mix the emulsion with the killed whole broth cultures of streptococci and B. influenzae. Dilute the concentrated emulsion as follows:

Final dilution: If sterility cultures are negative on the concentrated emulsion, calculate the amount of salt solution necessary to dilute the emulsion to one-fifth the original total volume of broth culture, assuming one billion organisms to each c.c. of original culture. For purposes of calculation, double the volume of staphylococcus and influenza cultures used. Make a trial dilution in this ratio with a small amount diluted in sterile salt solution. Compare with a turbidity standard representing approximately five billion of the mixed organisms per c.c. and vary the dilution to match this standard. Then dilute the whole amount as indicated and add

additional cresol, if necessary, to bring the final strength of cresol to .4%. Test the final dilution for sterility as before, and tube the material into final containers.

Final sterility test: Select three final containers from each lot and make the following tests:

(1) Three loopfuls are transferred into 100 c.c. flasks of broth and grown for forty eight hours at 37°C.



PHOTOGRAPH III.

Filling the final containers with influenza-pneumonia vaccine.
Bureau of Laboratories, Department of Health.

(2) One loopful is transferred to a blood agar slant and a sub-culture made from this. These are also grown for forty-eight hours at 37°C.

(3) Five drops and twenty drops respectively are inoculated into duplicate fermentation tubes of dextrose broth after steaming for thirty minutes in an Arnold sterilizer and removal of all air bubbles while hot to preserve anaerobic conditions. These are grown for seven days, after which both the open and closed arms are examined for growth.

(4) Inject 5 c.c. intraperitoneally into a guinea pig. Observe the animal for one week.

Results of vaccination in Chicago: On January 1, 313,028 average doses of mixed vaccine had been given out by the Bureau of Laboratories. Of this amount, 171,264 doses

were given to physicians in the City of Chicago and the remainder to the Director of Public Health of the State of Illinois for general distribution throughout the State. To each physician receiving vaccine a blank form was furnished on which to report results of vaccination. A copy of the form for physicians is inserted herewith, and that used for reports on groups is shown in Table XXVI under the results observed at the I. H. plant.

Dr. _____
Address _____
Telephone _____
Institution • _____

COMMITTEE ON VACCINES

DEPARTMENT OF HEALTH
CHICAGO, ILLINOIS

Physicians' Record of Influenza Vaccine Inoculation.

[illegible]

● 金魚は、17℃前後で最もよく泳ぐ。

PLEASE ATTACH PROPERLY FILLED OUT TO DEPARTMENT OF HEALTH CITY HALL, 1000 15th St., N.Y.C.

PHOTOGRAPH IV.

Physicians' Record of Influenza Vaccination

Of the 171,264 doses distributed in Chicago, reports of 24,549 vaccinations were received in time for publication in this report. In presenting a study of the available data regarding the results of vaccination, the difficulty of obtaining conclusive evidence under the conditions of the experiment is frankly recognized. Vaccination was introduced at the apex of the epidemic and it was not possible under the stress of the moment and in the face of the urgent demand for the vaccine to secure its administration under controlled conditions. The experimental difficulties encountered and the manner in which each was dealt with, are enumerated as follows:

(1) Receipt of incomplete reports from physicians. Such reports were followed up as fully as possible by investigators from the Bureau of Laboratories.

(2) Absence of strictly comparable controls, i. e. a sufficient number of unvaccinated persons under the same living conditions and the same conditions of exposure as the unvaccinated. In lieu of such controls the case rates and death rates at large in the city were accepted as the best available data representing the unvaccinated. *The case rates and death rates used were the totals of influenza and pneumonia cases and deaths reported to the Health Department.

(3) The fallacy of drawing conclusions in the declining stage of the epidemic. To minimize this error, the case rates and death rates were collected from that period only in which the vaccinating was done, that is, after October 22.

(4) The tendency of physicians to report favorable results to the neglect of unfavorable results in dealing with a new therapeutic agent. To counteract the effect of such tendency on the final results, Dr. W. A. Evans issued a request in the columns of the Chicago Tribune for reports of unfavorable results following vaccination. All reports received by him relating to the Health Department vaccine have been included in the tabulations.

A table summarizing the accumulated data received from physicians from the time vaccination began up to January 1, is given in Table XXIV.

The accumulated totals reported up to January 1 show that in a group of 3,602 individuals who were given the complete course of three vaccinations for prophylaxis, 12 cases of influenza developed, making a case rate of 3.3 per thousand. No deaths and but one bronchial pneumonia were reported in this group. Of 8,914 persons receiving two inoculations, 19 developed influenza, a case rate of 2.1 per thousand. No deaths and no bronchial pneumonias were reported. Of 12,033 persons receiving the first vaccination 91 subsequently developed influenza, a case rate of 7.6 per thousand. Eighty-one of these cases of influenza were classified as mild and 10 as severe. Nine cases of bronchial pneumonia, making a rate of .75 per thousand, and two deaths, making a rate of .17 per thousand, were reported.

The corresponding incidence of influenza in the population at large from October 22 on, was: Influenza and pneumonia 12.1 per thousand, pneumonia 3.3 per thousand, deaths from influenza and pneumonia 2.3 per thousand of population.

It will be seen that the incidence of influenza infections, the incidence of complicating pneumonia and the incidence of deaths were all lower in the vaccinated group than in the population at large during the same period. It also appears

*The unvaccinated of industrial groups constitute a more satisfactory control. See supplementary report, page 136.

Table XXIV.

INFLUENZA AND PNEUMONIA CASES AND DEATHS IN THE VACCINATED IN THE CITY OF CHICAGO.

No. inoc.	No. persons vac. for prophylaxis	Influenza infections in individuals vac. for prophylaxis		Broncho pneumo. in individuals vac. for prophylaxis		Deaths in individuals vac. for prophylaxis	
		No.	Rate per 1000	No.	Rate per 1000	No.	Rate per 1000
First inoc.	12033	91	7.6	9	.75	2	.17
Second inoc.	8914	19+	2.1	0	0	0	0
Third inoc.	3602	12+	3.3	1	.28	0	0

*81 mild.

10 severe.

+all mild.

INFLUENZA AND PNEUMONIA CASES AND DEATHS AT LARGE IN THE CITY OF CHICAGO.*

Period	Cases of Infl. & Pneumo. reported to Health Dept.		Cases of pneumonia reported to Health Dept.		Deaths from Infl. & pneumo.	
	No.	Rate per 1000	No.	Rate per 1000	No.	Rate per 1000
Period of vaccination Oct. 22 to Jan. 1.	31,433	12.1	8,720	3.3	6,069	2.3
Period of height of epidemic Oct. 1 to Nov. 25.	51,873	19.9	13,556	5.2	8,758	3.3

*Population estimated at 2,596,681.

Calculated for the period only. Not on yearly basis.

TABLE SHOWING NUMBER OF REACTIONS REPORTED AFTER VACCINATION.

	LOCAL		CONSTITUTIONAL	
	No.	Rate per 1000	No.	Rate per 1000
First injection	66	5.5	34	3
Second injection	4	.5	2	.25
Third injection	4	1.3	1	.3
Total	74	3	37	1.5

that no deaths and but one case of pneumonia were reported among those vaccinated for prophylaxis after the second and third injections. It is evident that the first vaccination does not protect to the same extent as the later vaccinations. The number of severe reactions reported following vaccination is very low. Reactions classified as severe, included 74 local reactions, a rate of 3 per thousand, and 37 general reactions, a rate of 1.5 per thousand injections.

Study of a single group: The plant of the H. Furniture Company, located in the southern portion of the city, was selected for study because of the fact that the majority of its employes resided on the South Side, which was the portion of the city last visited by the epidemic. This fact made it possible to begin the vaccination before the disease appeared in the group. The total number of employes in the plant was 668. Of these, 168 received the first vaccination, 46 received the second vaccination and 5 received three vaccinations. The remaining 500 were not vaccinated and therefore constitute a fairly satisfactory control group for purposes of comparison.

The following table shows the results of the study:

Table XXV.

PROPHYLATIC VACCINATION IN EMPLOYES OF
H. FURNITURE COMPANY.

	No. of persons	Influenza infections after vacc. began	Broncho pneumo. after vacc. began	Deaths after vacc. began
First vacc.	168	2	0	0
Second vacc.	46	0	0	0
Third vacc.	5	0	0	0
Not vacc.	500	34	3	1

When the vaccination began there had been no cases of influenza. Subsequent to vaccination, two mild cases appeared in the vaccinated group with no bronchial pneumonias and no deaths. In the unvaccinated group 34 cases of influenza developed after the vaccination began. There were also 3 bronchial pneumonias and 1 death in the unvaccinated.

An additional study of a single group is given below, as received from a large manufacturing plant in the city:

Table XXVI.

Date, December 4, 1918.

COLLECTIVE RECORD FOR LARGE GROUPS.

Name of Firm or Institution.....	I. H. Co.	
Date of appearance of first cases of Influenza in group.....		Sept. 15, 1918
Date vaccinating began		Oct. 22, 1918
Total persons in group both vaccinated and unvaccinated.....		20704
Number of Influenza Infections before vaccination began.....		2300
Number of Influenza Deaths before vaccination began.....		27
Number of well persons vaccinated once.....		1261
Incidence of Influenza Infections after 1st vaccination.....		4
Incidence of Broncho Pneumonias after 1st vaccination.....		1
Incidence of Influenza Deaths after 1st vaccination.....		0
Number of well persons vaccinated twice.....		1037
Incidence of Influenza Infections after 2nd vaccination.....		0
Incidence of Broncho Pneumonias after 2nd vaccination.....		0
Incidence of Influenza Deaths after 2nd vaccination.....		0
Number of well persons vaccinated three times.....		224
Incidence of Influenza Infections after 3rd vaccination.....		0
Incidence of Broncho Pneumonias after 3rd vaccination.....		0
Incidence of Influenza Deaths after 3rd vaccination.....		0
Number of persons unvaccinated		19440
Incidence of Influenza Infections after vaccination began.....		1516
Incidence of Broncho Pneumonias in unvaccinated, infected after vaccination began		85
Incidence of Influenza Deaths in unvaccinated, infected after vaccination began		57
Number of persons sick with Influenza treated with vaccine, if any.....		3
Number of vaccine treated cases recovered.....		3
Number of vaccine treated cases developing Broncho Pneumonia.....		0
Number of Deaths in vaccine treated cases.....		0

Comment—No cases of Influenza developed later than three days after the first vaccination in vaccinated persons. No pneumonias developed in those vaccinated except one case which appeared in twenty-four hours after the first vaccination.

Signed, C. M. P.

In the above group it will be noted that before vaccination began on October 22, there had been 2,300 cases of influenza and 27 deaths. After 1,261 first injections, 4 cases of influenza developed in those vaccinated within 3 days, with one broncho-pneumonia in 24 hours and no deaths. After 1,037 second injections and 224 third injections no further cases of influenza or pneumonia developed and no deaths occurred.

In the period following the first vaccination, 1,516 cases of influenza developed in the unvaccinated persons of the group. Of these 85 developed broncho-pneumonia and 57 died.

Theoretical considerations: That prophylactic administration in large doses of an antigen containing killed pneumococci, streptococci and staphylococci, would result, after a reasonable time, in the formation of specific antibodies in sufficient quantity to afford protection against the fatal pneumonias commonly following influenza and due to secondary infection with these organisms, is a reasonable expectation consistent with the accepted facts of immunology. As far as it is possible to judge from the data now at hand, the Rosenow product seems to have afforded such protection in the epidemic in Chicago. The lower case rate of influenza proper, however, which appears also to have resulted from the use of the Rosenow vaccine, is not so readily explainable. In view of the fact that the primary cause of influenza is not established and that the Eastern reports indicate that vaccination with *B. influenzae* alone has not prevented the disease, the presence of *B. influenzae* in the Rosenow vaccine does not offer a satisfactory explanation of the phenomenon observed. We are inclined to believe that the apparent protection against influenza proper is not specific in nature, but may be due to a transient stimulation of phagocytosis associated with the leucocytosis which is known to be produced by the vaccine. Such a leucocytosis has been found by us to be maintained from 10 to 12 days after vaccination. It may during this time afford protection against an infection characterized by a pronounced leucopenia. Reasoning along these lines, it may be expected that the protection against influenza proper will be short lived while the specific immunity against organisms producing secondary bronchial pneumonia will be more prolonged.

TREATMENT WITH IMMUNE HUMAN SERUM.

Redden and McGuire²¹ of the Chelsea Naval Hospital, Chelsea, Mass., have reported favorable results in the treatment of influenza-pneumonia with convalescent human serum. They treated over 400 cases with various methods. After using the serum from convalescent influenza-pneumonia patients with good results on two cases they were led to use it in a larger series. Of their first 37 cases on which the serum was used, all of which were severe, only one died. This patient did not receive the first dose of the serum until the fifth day of the disease. In commenting on the efficiency of this method of treatment they state that in their opinion it acts almost as a specific.

The serum is prepared by bleeding convalescent patients

21) J. A. M. A. Vol. 71, No. 16, Oct. 19, 1918, pg. 1311.

within a week or ten days after the temperature has dropped to normal. The serum from all donors is pooled. They found it unnecessary to continue the compatibility test of donors' serum with the recipient's corpuscles. Between 100 and 200 c.c. of serum are given every eight hours until results are obtained.

Early in October the commissioner of health sent a member of the Health Department staff to the east for the purpose of studying the various methods of serum and vaccine treatment employed there. The favorable results observed from the serum treatment in the east impelled the commissioner of health to urge upon representatives of the various hospitals and medical laboratories in the City of Chicago to have their respective laboratories prepare and have on hand a sufficient quantity of serum collected from convalescent patients for the treatment of all urgent influenza cases admitted to their hospitals.

COMMISSION ON MEDICAL TREATMENT.

On Sunday, October 6, a meeting of medical men was called by the commissioner of health at the Morrison Hotel for the purpose of giving consideration to the question of the treatment of influenza cases. After a full discussion of the subject the following statement was issued to the public:

"Under the name influenza are included a number of different infections bearing a general resemblance but different in nature. It is an infectious disease, and the chief predisposing factors favoring infection are alcoholism, fatigue, exposure, cold, overheating, overcrowding, poor ventilation. It is probably a contact infection, the infectious agents being found mainly in the secretions of the nose and throat. An early diagnosis is of greatest possible importance in the treatment and prevention of the disease.

Therefore all suspected cases should remain in bed and send for a physician. The public is especially warned against the following:

The unadvised, indiscriminate use of local treatment of nose and throat by means of sprays and washes.

The use of alcoholic liquors under the guise of stimulants.

The use of patent medicines, nostrums, and opiates such as codein, morphin, heroin.

Self-treatment.

Neglect is responsible for many deaths. It is our opinion that there is no warrant for public alarm or panic, but abundant reason for prudence.

It is our opinion that the health authorities have the situation well in hand and are amply able to deal with it adequately."

This was signed by Drs. William E. Quine, George W. Webster, Finley Ellingwood, Joseph P. Cobb, Nathan A. Graves, D. V. Halbert and A. L. Blackwood.

There was quite a unanimity of opinion among the physicians present in regard to the drugs that should not be used. The commissioner of health had previously warned the public against the use of patent and proprietary cough syrups and especially those containing opium or some one of its alkaloids or combinations. This was done on the theory that morphin, codein and opium were responsible for a large number of deaths in this epidemic.

Dr. B. Fantus²² states: "I believe the prescribing of an opiate whether by itself or in complex cough syrups is a pernicious practice, a direct invitation to the onset of bronchopneumonia."

A survey to determine how extensively narcotics were used in the treatment of influenza and pneumonia following influenza was made by the Health Department in the last week of December. The school health officers were detailed to do this work while the schools were closed.

Of the 1,200 drug stores in the city, 946 were visited and the information desired was copied from the prescriptions filled between October 1, and November 1. The results of this investigation are given in the supplementary report of this article.

THE BAN ON CLOSING LIFTED.

Theaters: From October 15 to October 30 all theaters in the city remained closed. During this period the owners and managers were notified that the Health Department would not allow any theater to reopen, even after the general ban was lifted, if the playhouse was not first cleaned and renovated and put in good sanitary condition. The notice requiring a general cleanup sent by the bureau of sanitation on October 26, read as follows:

"Floors to be scrubbed; walls and ceilings, if dusty or dirty, to be washed and calcimined or painted; woodwork to be thoroughly washed; toilet compartments and

22) J. A. M. A. Vol. 71, No. 21, Nov. 23, 1918, pg. 1736.

plumbing fixtures to be thoroughly cleaned and put into good repair; ventilating equipment to be thoroughly cleaned and put into mechanical operating condition; heating plant to be put in good repair; accumulations of rubbish to be removed from cellars and walls and ceilings to be whitewashed."

The managers were further notified to make application to the Health Department, after completing this renovation, so that the premises might be inspected without delay. Simultaneously, instruction sheets embodying practically the same requirements, were drafted and distributed to the inspectors detailed for this inspection work. A report on the following conditions was required:

1st—*Floors:*

Cleanliness and general sanitary condition.

2nd—*Walls and ceilings:*

Cleanliness and general sanitary condition.

3rd—*Woodwork:*

Cleanliness and evidence of recent painting.

4th—*Toilets:*

Cleanliness and general sanitary condition of compartments and fixtures; adequate flushing of fixtures; proper working condition of mechanical parts of equipment; adequate ventilation of compartments.

5th—*Drinking fountains:*

Sanitary and operating conditions.

Abolition of common drinking cups or glasses.

6th—*Ventilating System:*

Cleanliness and general sanitary condition of system; mechanical operating condition; removal of foreign matter from intakes, heaters, etc.

Subsequently it was publicly announced through the medium of the press that the theaters would reopen the 30 of October. The reopening program was carried out by dividing the theaters into three groups as follows:

(a)—All theaters north of Diversey Boulevard to be reopened Wednesday, October 30.

(b)—All theaters between Diversey Boulevard and 12th St., from the lake to the west limits of the city, to be reopened Thursday, October 31.

(c)—All theaters south of 12th St. to be reopened Friday, November 1.

This was done to facilitate the handling of the work and because of the epidemic had first subsided on the North Side.

These groups were further subdivided into twelve zones in the outlying districts and one zone for the "loop" or central business section, making a total of 13 zones. Two inspectors were assigned to each of the outlying zones and the central zone was taken care of by the two ventilation engineers of the ventilation division, thus making a total of 26 persons employed for the work of inspecting the 403 theaters for which applications to reopen were received. Five days were required to complete these investigations, with the result that 372 theaters were allowed to reopen and 31 were refused this permission to reopen for failure to comply with the clean-up requirements.

Every theater found to be in a satisfactory condition in every respect was reopened in accordance with the schedule adopted. A permit (see appendix G) was issued to all houses receiving the department's approval and the managers were requested to display the same in a conspicuous place. Theaters failing to procure one of these permits were not allowed to reopen their doors to the public. With the aid of the Police Department a careful check was made to see that there were no violations of this order or the one affecting the ten o'clock closing regulations imposed upon the managers the first few days of the revival of theater activities.

With the reopening of the theaters on the 30th of October approximately 360 employes of the Health Department were assigned to the various show houses with instructions to read a letter (see appendix H) in the form of a short health talk by the commissioner of health to the audience at every performance. Watch was also kept by the employes thus assigned for violations of the anti-coughing, sneezing and spitting order. This was kept up for a period of five nights and was discontinued when the public generally had become acquainted with the restrictions placed on theatergoers by the Department of Health.

Assembly Halls: The ban on assembly halls other than lodge halls was also lifted on October 30. Music and the usual entertainments in restaurants were again permitted on October 29.

Dance and Lodge Halls: Owing to the difficulties involved in inspecting approximately 1,000 dance and lodge halls in a short space of time it was decided to allow the reopening of these places on November 4 on the condition that the following requirements be fully complied with:

General Sanitation: Floors, walls and woodwork to be thoroughly scrubbed and cleaned. Wood floors to be painted or oiled unless other covering is used. If carpets are used, same to be removed and renovated. Draperies, flags, banners, etc. to be removed and renovated. Dirty walls to be calcimined or painted.

Plumbing: Lavatories, water closets and other plumbing fixtures to be placed in first class sanitary and operating condition. Flushing apparatus to be put in perfect working order. Compartments to be thoroughly aired and ventilated.

Ventilation: Windows to be cleaned and put in good operating condition so each can be opened both from top and bottom. If the hall is provided with a mechanical ventilating device same must be thoroughly cleaned and put in good mechanical operating condition.

A notice to this effect went out on November 4 and the permits allowing reopening were issued as soon as applications were filed and inspection showed that the requirements of the department had been complied with. Up to November 25, 450 applications have been received. Assignments for inspections were made and 13 inspectors detailed to report on conditions in all halls having filed applications. The same zoning method adopted for the theater inspection service was adhered to in this campaign. The inspections were continued until all the halls were covered and required approximately two or three weeks for completion, owing to the reduction in the number of inspectors available for this duty and the length of time required to make the necessary renovations demanded by the department.

Social Functions, etc.: On November 4 the ban was also lifted on social functions, entertainments, athletic contests and other forms of public amusement.

BAN ON SMOKING NOT LIFTED.

The ban on smoking on street and elevated cars has not been lifted. During the rush hours the street cars and elevated cars in the City of Chicago are always very crowded.

During the epidemic every effort was made to see that the cars were properly ventilated. The doors in the front vestibules of the surface lines were required to be kept open and smoking in these vestibules was prohibited. On the elevated and steam roads the smoking cars were discontinued and thrown open for the use of all passengers. This distributed the load and prevented much crowding that would otherwise have occurred.

So long as there is smoking on cars it will be impossible to prevent expectoration. The front platforms of street cars, when smoking was in vogue, were invariably covered with sputum from smokers and yet passengers were required to leave the car by way of these platforms in order to facilitate the handling of crowds. Women and children whose clothing became contaminated in leaving the cars thus became innocent carriers of infection to others. Similarly in the "smokers" on the steam cars and elevated roads and on the elevated platforms the spitting nuisance was never abolished completely while smoking was permitted. Consequently, the commissioner of health, firm in the belief that the danger of disseminating disease germs from this source would continue as long as smoking in public conveyances was allowed, has requested the street and elevated railways companies to make the ban on smoking in cars effective during the epidemic, a permanent order prohibiting this nuisance.

CONCLUSIONS

Numerous definite conclusions might be drawn, based on the facts set forth in this report. A complete analysis, which would necessitate the restatement of so many unessential details, is omitted, and only the important deductions made from the outstanding features are summarized herewith.

1. The 1918 pandemic of influenza followed approximately within twenty days after the first occurrence of the disease in the east and was preceded by local epidemics of the disease at the Great Lakes Naval Training Station and the north shore towns.

2. The maximum annual death rate of 63.0 per 1000 during the week when the disease reached its height is not alone attributable to geographic location or climatic conditions.

3. Pneumonia was unusually prevalent in Chicago and elsewhere throughout the United States during the two winters preceding the recent epidemic of influenza.

4. An unusual preponderance of cases occurred among the 20 to 40 year age group. This was not characteristic of the pneumonia outbreak in Chicago during March, 1917, and only slightly so of the 1890-1891 influenza epidemic.

5. Children of school age were relatively quite immune.

6. The native born were less affected than the foreign born. The greatest percentage increase in deaths occurred

among natives of Hungary, Austria and Italy, and in Slavic descendants.

7. The colored race was more immune than the white.

8. Females were more affected than is usually the case during pneumonia outbreaks.

9. The bacteriology of the recent epidemic is as yet ill defined, but bears certain resemblances to the pneumonia observed in preceding years.

10. The disease was much more severe in the early part of the epidemic. During the first three weeks of the outbreak the largest number of deaths occurred after an illness of only seven days, while during the latter part the majority of the deaths resulted after an illness of 10 days or longer.

11. Persons afflicted with pulmonary tuberculosis were comparatively immune from influenza and no increase in the pulmonary tuberculosis death rate occurred during the epidemic.

12. Prophylactic vaccination, although studied in this report only during the waning period of the disease and to a limited extent, seems to be beneficial as a preventive measure.

13. Pneumonia and high death rates from acute respiratory diseases were a manifestation of the 1890 epidemic for a period of four years following the onset.

14. Further investigation may show that the recent outbreak was an exacerbation of an epidemic of influenza-pneumonia starting in 1917.

15. A high death rate from acute respiratory diseases will probably prevail during this winter and next winter and spring.

16. Consequently the most effective preventive measures employed during the recent epidemic, namely, publicity, education, and prohibition of spitting and uncovered coughing and sneezing, together with the quarantine of all cases, should be continued vigorously.

17. Prophylactic vaccination, if further reports on the results are favorable, should be recommended to the public in an emphatic way.

18. The beneficial effects of closing and prohibition of assemblage in a large commercial center are problematical. It is true that they impress upon the people the urgency of the situation, but this in turn may give rise to undue fear which is provocative of ill effects.

Supplementary Report on Influenza.

The preceding report on influenza was first published on December 1, 1918. This supplement covers December, 1918.
Course of Influenza.

In Table XXVII is given the number of cases and deaths occurring each week, from influenza and pneumonia, since November 23. These figures are given to supplement the data in Tables IX and X relative to the numbers of cases and deaths occurring weekly from influenza and pneumonia during the time covered by the original report.

Chart II has been revised to show the course of pneumonia and all acute respiratory diseases to the end of the year 1918.

Table XXVII.

INFLUENZA AND PNEUMONIA CASES AND DEATHS BY WEEKS.

Week Ending	Reported Cases			Deaths		
	Influ.	Pneu.	Both	Influ.	Pneu.	Both
Nov. 23	681	371	1,052	151	86	237
Nov. 30	745	281	1,026	152	67	219
Dec. 7	1,965	519	2,484	158	111	269
Dec. 14	3,074	766	3,840	276	162	438
Dec. 21	2,398	814	3,212	336	165	501
Dec. 28	1,235	518	1,753	271	155	426
Bal. Dec. (3 days)....	391	191	582	91	61	152
Total	10,489	3,460	13,949	1,435	807	2,242

A brief analysis of the figures in Table XXVII shows a decline to a low point of both reported cases and deaths in the week ending November 30, 1918. From this time on there was a considerable increase of reported cases, which reached its maximum in the week ending December 14, 1918. There was likewise an increase in the deaths, which reached its height during the week ending December 21, 1918. Then there followed a gradual decrease in both the number of reported cases and deaths which continued to the end of the year.

The increase in the reported cases and deaths during the first and second weeks in December showed nothing noteworthy relative to the distribution of the cases and deaths except a slightly higher incidence of the disease among children.

The secondary smaller wave of influenza and pneumonia which occurred in Chicago was likewise noted in many other cities within a short period after the recession of the first big wave.

Age Distribution.

A study of the age distribution of the cases of influenza reported to the Department from September 21 to November 1 was made by the division of child hygiene. The results of this study are presented graphically in Chart XXIII.

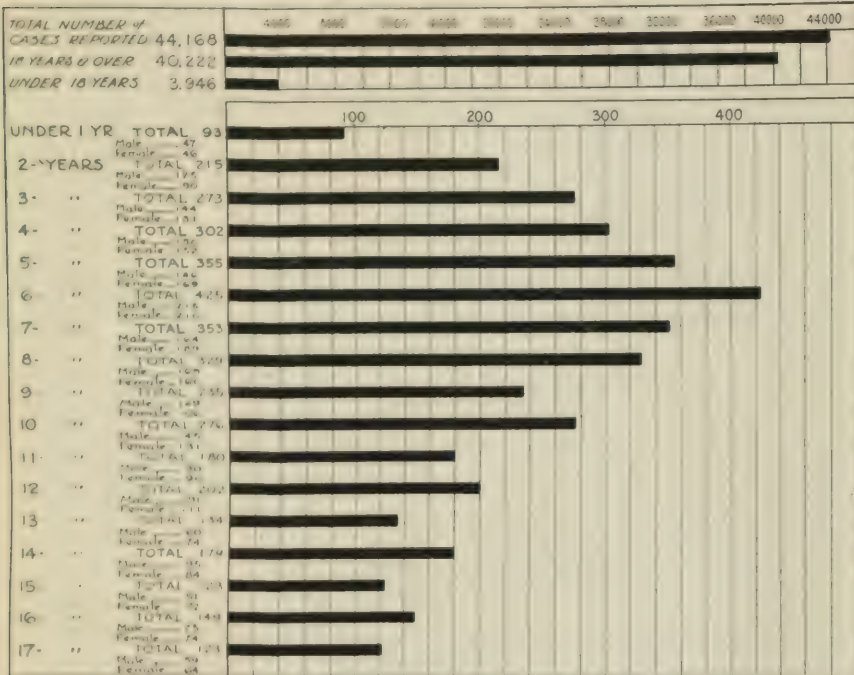


CHART XXIII.

Age Distribution of Cases of Influenza Reported.

(Exclusive of Pneumonia.)

The small proportion of cases under 18 years of age is strikingly shown by the relative length of lines in the upper part of the chart, representing respectively the total number of cases reported and the number of the same under 18 years of age. The grouping of the cases under 18 years of age, by years, shows the preponderance of cases at the ages of five to seven and greatest number in the six year group.

Inspection Service.

The inspection service described in the preceding report on influenza was continued by assigning all reported cases to the field health officers in the district. When the number of cases reported daily increased in the early part of December,

ten part-time field health officers at large were employed, and assigned to assist the health officers in the districts of the city where a large number of cases was reported daily.

Experience has shown that cases of epidemic influenza should be inspected and isolated or should be hospitalized as a routine procedure.

Use of Narcotics in the Treatment of Influenza.

During the Christmas and New Year holiday period while the schools were closed some of the school health officers were assigned, by the direction of the Commissioner to make a study of prescriptions on file in all drug stores in the city with the object of ascertaining how extensively narcotics were used in the treatment of influenza.

There are approximately 1,200 drug stores in the city, of which number 946 were visited. The prescriptions filled during October, 1918, were covered in this investigation, and the information obtained is shown in Table XXVIII.

Table XXVIII.

PRESCRIPTIONS FOR NARCOTIC DRUGS FILLED DURING EPIDEMIC OF INFLUENZA, OCTOBER, 1918.

Total Drug Stores visited	946
Total Number of Prescriptions filled	741,825
Total Number of Prescriptions filled for Influenza	441,641
Total Number of Prescriptions filled for Influenza containing narcotics	103,980
Principal Narcotics in Prescriptions calling for the same	
Chloral	3,866
Opium	17,504
Morphin	10,003
Codein	50,081
Heroin	17,812
Cocaine	1,383
Other	3,331
	<hr/> 103,980

LATER STUDIES OF THE RESULTS OF INFLUENZA-PNEUMONIA VACCINATION.

The later reports of the incidence of influenza, broncho-pneumonia and deaths in Chicago and vicinity after prophylactic vaccination with the Rosenow Vaccine bear substantially the same relation to the rates at large in the city as those previously published, and in so far as deduction may be justified from data of this character, point to the same general conclusions. Since that time the industrial and institutional groups in which vaccination was undertaken have

been made the subject of a special study by the bureau of laboratories. The groups referred to afford somewhat more satisfactory material for study because the most susceptible age groups of twenty to forty years are in predominance and because the unvaccinated portions of the groups constitute more closely related control data than the rates at large in the city.

A summary of the results of the group studies is given in Table XXIX.

This table presents the case incidence and death rates among 9,577 vaccinated persons with comparative data concerning 29,779 unvaccinated persons under similar occupational conditions. The table includes all of the groups reported to the Influenza Commission, although the data regarding the unvaccinated are not in all instances complete. The totals of all the groups show an influenza rate of 57.1 per thousand in the unvaccinated controls after the vaccination began, and corresponding rates of 6.9 per thousand, 1.3 per thousand and .8 per thousand respectively after the first, second and third inoculations in the vaccinated. The bronchial pneumonia rate was 3.6 per thousand in the unvaccinated and .7 per thousand after the first vaccination. No cases developed after the second and third vaccinations. The death rate in the unvaccinated was 2.5 per thousand and in the vaccinated .1 per thousand after the first injection. No deaths were reported after the second or third injections.

The returns from the state of Illinois, however, exclusive of Chicago and vicinity are decidedly less favorable. These are given in Table XXX.

Table XXX.

TABLE SHOWING INCIDENCE OF INFLUENZA, PNEUMONIA, AND DEATHS IN INDIVIDUALS VACCINATED FOR PROPHYLAXIS IN THE STATE OF ILLINOIS, EXCLUSIVE OF CHICAGO.

No. of Inoc.	No. persons Vaccinated	Influenza Infections		Broncho Pneumonias		Deaths	
		No.	Rate per 1000 Vaccinated	No.	Rate per 1000 Vaccinated	No.	Rate per 1000 Vaccinated
First Inoc.	5876	241	41.	23	3.9	12	2.
Second Inoc.	5014	69	13.7	2	.4	1	.2
Third Inoc.	4427	89	20.1	8	1.8	0	0.

The influenza incidence if, lacking other control data, we may judge from the corresponding rates at large in Chicago,

Table XXIX.

SUMMARY OF REPORTS OF INDUSTRIAL AND INSTITUTIONAL GROUPS IN CHICAGO AND VICINITY SHOWING INCIDENCE OF
PNEUMONIA AND INFLUENZA AND DEATH RATES IN VACCINATED AND UNVACCINATED
INDIVIDUALS DURING PARALLEL PERIODS.

Name	1st Inoculation		2nd Inoculation		3rd Inoculation		Unvaccinated, after vaccination began	
	No.	Influenza Pneu. Deaths	No.	Influenza Pneu. Deaths	No.	Influenza Pneu. Deaths	No.	Influenza Pneu. Deaths
H. Co.	168	2	0	0	5	0	500	34
A. R. C.	190	0	0	0	190	0	0	3
R. Co.	400	0	0	0	400	0	450	0
N. W. Co.	265	0	0	0	225	1	15	15
Ill. M. O. Home	43	25	0	0	0	0	0	0
A. S. & G. Wks.	330	2	0	0	188	0	2000	1
R. Hotel	90	0	0	0	0	0	1	0
L. Houses	450	0	0	0	0	0	0	0
U. S. M. Co.	950	6	3	6	110	0	582	0
C. B. & Q*	190	6	0	0	96	1	2163	4
Flt. S.	2000	0	0	0	0	0	0	2
M. N. O. Home	300	0	0	0	0	0	0	0
U. B. Co.	78	0	0	0	0	0	0	0
U. P. D.	491	0	0	0	491	0	0	0
A. M. F. Co.	100	0	0	0	17	0	2900	2
L. M. Hosp.	52	0	0	0	51	0	64	2
S. & Co.	154	1	1	0	10	0	0	0
C. S. Co.	290	0	0	0	0	0	0	0
C. A. Bn.	100	0	0	0	0	0	0	0
A. & W.	168	1	0	0	40	0	597	2
A. C. Co.	165	2	0	0	164	0	2	2
L. B. No. 22	76	1	0	0	0	0	0	0
C. B. & Q. Web. A.	110	0	0	0	35	0	0	0
McC. & Co.	546	0	0	0	13	0	0	0
B. B. School	307	15	0	0	200	0	0	0
I. H. Co.	1251	5	1	0	224	0	19422	85
B. D. Co.	243	0	0	0	0	0	155	57
Total	9577	66	7	9	2459	2	29779	1703
Rate per 1000		6.9	.7	1.3	.8	0	57.1	3.6

*Data confirmed as of Jan. 1, 1918, by Bureau of Laboratories.

was not at all influenced by vaccination in the down state districts. The bronchial pneumonia rate, however, was lower after the second and third inoculations. The death rates also were apparently reduced after the second inoculation and no deaths were reported after the third inoculation.

The discrepancy between the results in Chicago and those in the state of Illinois at large may be explained on one of two hypotheses. Either, as is stated by Rosenow, it is necessary to adjust the vaccine closely to the organisms locally prevalent and the organisms prevalent at large in Illinois were not immunologically the same as the Chicago strains used in the vaccine; or the fact that the epidemic reached its height in the middle and southern portions of the state after the Chicago epidemic had declined, made relatively earlier vaccination possible so that the results are not influenced to the same extent as in Chicago by the declining phase.

Summarizing the data available up to the time of writing, the following generalizations relative to the value of vaccination appear to be justified.

1. The death rates from influenza and pneumonia in Chicago and the state of Illinois were materially lower in individuals vaccinated for prophylaxis than in the unvaccinated.

2. No deaths were reported in individuals vaccinated for prophylaxis in Chicago or in the state of Illinois after the third inoculation.

3. The reported incidence of broncho-pneumonia in individuals vaccinated for prophylaxis in Chicago and the state of Illinois was lower after second inoculation than in the unvaccinated.

4. The reported results from the state of Illinois exclusive of Chicago and vicinity indicate that the incidence of influenza proper was not materially influenced by vaccination.

5. The reported incidence of influenza proper in Chicago after prophylactic vaccination during the declining stage of the epidemic was lower than in the unvaccinated groups. In view of the unfavorable down state reports, this observation is probably more apparent than real, and due to the influence of the declining phase of the epidemic upon the reported data. From the evidence as a whole it appears to be doubtful if vaccine exerts a protective influence against influenza proper.

APPENDIX

(A)

Name of Firm.....

Total Number of Employees.....

Average number absent under normal conditions.....

Number of employes absent on dates indicated below

Date	Total No. Absent	Absent Account of Illness	Absentees Known to Have Influenza or Pneumonia	Deaths from Influenza or Pneumonia
Sept. 23				
" 24				
" 25				
" 26				
" 27				

Etc. to

Oct. 31

(B)

United States Public Health Service

RUPERT BLUE, Surgeon General

“Spanish Influenza”

"THE FLU"

The most accurate information obtainable in regard to influenza is given in the article below, which was handed to me by Surgeon General Blue with the request that it be brought to the attention of every man, woman and child in the City of Chicago.

JOHN DILL ROBERTSON.

Commissioner of Health.

1. The first group of people who are interested in the study of the history of the world are the historians. They are people who study the past and try to understand what happened and why it happened. They use a variety of sources, including books, documents, and artifacts, to reconstruct the past. They also try to understand the people who lived in the past and how they thought and felt. Historians are interested in the past for a variety of reasons. Some are interested in the past because they want to know what happened and why it happened. Others are interested in the past because they want to understand the people who lived in the past and how they thought and felt. Still others are interested in the past because they want to learn from the mistakes of the past and avoid them in the future.

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[illegible]

It was pointed out that he can be arrested only by someone who meets with him after sunset in the field in a cottage. The transfer of the STAS to a group of people was being done, taking into account the fact that the STAS was a group of people who were not yet organized.

...the others.

...the

1933. American Society for the Advancement of Science. 1933.

in giving advice to all kinds of sports. The book is strong and also of great interest. It is a book to be read and not a book to be looked at. It is a book to be read and not a book to be looked at. It is a book to be read and not a book to be looked at.

[illegible]

...the people should consider the
...the people should consider the
...the people should consider the

It is especially important to beware of the person who works or engages without creating his own business. The person who works for others is always in a position of weakness.

...the
... ..
... ..
... ..

2000 of rock and 1 ton of water
to the bottom of the canyon.

DON'T WORRY! There were eleven fewer deaths in Chicago during the last sixteen days than during the same period last year, in spite of the impending epidemic.

JOHN DILL ROBERTSON,
Commissioner of Health.

(C)

INFLUENZA

FREQUENTLY COMPLICATED WITH

PNEUMONIA

IS PREVALENT AT THIS TIME THROUGHOUT AMERICA.

THIS THEATRE IS CO-OPERATING WITH THE DEPARTMENT OF HEALTH.

YOU MUST DO THE SAME

**IF YOU HAVE A COLD AND ARE COUGHING AND
SNEEZING. DO NOT ENTER THIS THEATRE**

GO HOME AND GO TO BED UNTIL YOU ARE WELL

**Coughing, Sneezing or Spitting Will Not Be
Permitted In The Theatre. In case you
must cough or Sneeze, do so in your own hand-
kerchief, and if the Coughing or Sneezing
Persists Leave The Theatre At Once.**

**This Theatre has agreed to co-operate with
the Department Of Health in disseminating
the truth about Influenza, and thus serve
a great educational purpose.**

**HELP US TO KEEP CHICAGO THE
HEALTHIEST CITY IN THE WORLD**

JOHN DILL ROBERTSON

COMMISSIONER OF HEALTH

(D)

Chicago, Oct. 15, 1918.

Hon. John H. Alcock,

Acting General Superintendent of Police.

Dear Sir:—

I beg to advise you that a commission composed of medical representatives of the United States Army and Navy and the representatives of the Departments of Health of the State of Illinois and of the City of Chicago and a representative of the Red Cross, after very careful consideration and deliberation, have reached the conclusion that in order to combat the influenza and allied diseases which are now epidemic not only in the City of Chicago and State of Illinois, but elsewhere throughout the United States, and to guard and protect our people from the ravages of those diseases and check the progress of the same and to limit as far as possible the number of deaths from said diseases, it is essential and they have recommended that in addition to the places heretofore ordered closed the following should also be closed:

1. All night schools.
2. All theaters, motion picture theaters and skating rinks.
3. Also that lodge meetings be discontinued.

Acting upon the above recommendation and also pursuant to my own investigations and knowledge with respect to the situation, and by virtue of the authority and direction of the director of public health of the State of Illinois and of my own powers as commissioner of public health of the City of Chicago, I hereby request you to take the necessary steps immediately to close all places of the kind above mentioned, and to keep them closed until the necessity for closing them shall have ceased to exist.

The commission may conclude that it may also be necessary to close other places of amusement for the purposes above indicated, but in case such necessity arises I shall particularly point out to you in a subsequent communication the kind of places so to be closed.

(Signed) JOHN DILL ROBERTSON,

Commissioner of Health.

(E)

October 18, 1918.

Hon. John H. Alcock,

General Superintendent of Police,
City of Chicago.

Dear Sir:

By advice of the Influenza Commission, Dr. C. St. Clair Drake, State Director of Public Health of the State of Illinois, has promulgated the following order:

"The Department of Public Health of the State of Illinois, by virtue of the power in it vested, does hereby order and direct that all public gatherings of a social nature not essential to the war be discontinued until the further order of this department.

"It is further ordered that at all public gatherings not herein expressly prohibited and prohibited by previous orders of this department, the following rules and regulations must be observed:

A condition of crowding shall be prohibited.

Persons affected with colds shall not be admitted.

Coughers, sneezers and spitters shall be excluded or expelled.

The premises shall be properly ventilated, heated and cleaned."

In compliance with the above order, and by virtue of the powers in me vested as Commissioner of Health of the City of Chicago, I hereby make the following rulings:

1. The following public gatherings are prohibited:

Banquets and dinners of a public nature.

Conventions not approved by the State Council of Defense.

Lectures, debates and recitals.

Social affairs and meetings of clubs, societies, lodges, labor unions, local improvement associations, and similar organizations.

Athletic contests, indoors or outdoors, of a public nature.

2. To prevent public gatherings of a social nature the following rules will be enforced:

All music and other entertainments in cafes, cabarets and similar places are prohibited.

All billiard, pool and bowling matches of an exhibition nature are prohibited.

3. For the protection of those present at public gatherings which are permitted, the following rules will be enforced:

All poolrooms, billiard halls and bowling alleys will be thoroughly ventilated and frequently aired out.

Crowding in saloons will be prohibited.

Hotels will keep their lobbies free of loiterers and prevent undue crowding.

4. The use of swimming pools is prohibited.

I have the honor to request that you will see to it that the above orders of the State Director of Public Health and of the Commissioner of Health of the City of Chicago are rigidly enforced.

It is to be understood, however, that this order does not apply to activities devoted entirely to the sale of Liberty Bonds.

It is further ordered that wherever members of your department see children congregating together on the streets or at other public places, including playgrounds, outside of the time school is in session, they shall be warned that they will not be permitted to do so. If they fail to heed the warning, they shall be taken to their homes and their parents interviewed, and if they do not appreciate the danger they should be instructed concerning the danger of permitting children to play together. If the warning of the officer is ignored, he should report the names and addresses of the parents to your office for further action.

Yours very truly,

(Signed) John Dill Robertson,
Commissioner of Health.

(F)

ARCHDIOCESE OF CHICAGO

CHANCERY OFFICE

740 Cass Street

Chicago, Ill., October 17, 1918.

Rev. dear Father:

In compliance with the directions of the State and City Departments of Health, the following regulations are herewith brought to your notice. During the period of the present epidemic of influenza or until further notice,

1. All evening services are suspended. The faithful may visit the Church during the day for private devotion, but there are to be no public devotions in the afternoons or evenings.

2. Wherever missions are being held, they must close with the end of this week, to be resumed, if so desired, after the wave of sickness has passed.

3. The Masses will take place on Sundays at the usual hours, but no service is to last over 45 minutes. All long sermons are prohibited for the meanwhile, and the clergy will prepare the scheduled Sunday instruction so that it is delivered within five minutes.

4. Between the Masses, the church is to be thoroughly ventilated for ten to fifteen minutes, while the people are out of the building, care being taken not to expose the parishioners unnecessarily to cold currents of air.

5. Additional ushers will be stationed in the aisles, not only to facilitate both the seating and the exit of the changing congregations, but also to request the departure of any person showing indications of having contracted the disease, by violent sneezing, coughing, etc.

6. Churches to be cleaned frequently, disinfectants used where necessary, and well-aired at all times.

7. During this period, all confirmation and other episcopal ceremonies are suspended, but such churches will receive preference when the epidemic has passed. As the Archbishop has promised the public authorities that every precaution will be taken by the churches under his care during the time of

this epidemic, he looks to each of his priests to see that in his own parish this promise is carried out to the letter.

Finally commend to the prayers of your people, particularly the children, the speedy recovery of all those on whom sickness has laid its hand and the early termination of this epidemic.

By Order of the Most Rev. Archbishop,

E. F. HOBAN,

Chancellor.

(G)

Permission to Reopen

Permission is hereby given to reopen the theater at _____, the conditions imposed by the Department having been complied with.

In connection with the reopening of this theater it is agreed that a representative of the Department shall be allowed, without charge, to explain at each performance the necessity of refraining from uncovered coughing and sneezing, as well as from spitting, in all public places. Also that the requirement of closing at 10 p. m. shall be enforced until released by due notice.

Respectfully,

(Signed) JOHN DILL ROBERTSON,

Commissioner of Health.

(H)

October 29, 1918.

Influenza and pneumonia, after passing over the greater part of Europe, arrived in America the latter part of August. Since then it has traversed practically all of the United States, destroying thousands of lives.

It first made its appearance at Great Lakes about September 8. It began to manifest itself in Chicago about September 20. Over six thousand people have died in Chicago during this epidemic.

Influenza and pneumonia are contagious diseases, spread by coughing, sneezing and spitting. Many people carry the

germs of these diseases who themselves are not sick. If such a person coughs or sneezes without a handkerchief before his face, germs are scattered in the air for others to breathe, and those who are susceptible become infected.

Many people cough or sneeze in their hands; then, without washing shake hands with others, thus passing to their friends the germs they had in their noses and throats. These practises are vicious and are responsible for many deaths. Do not cough or sneeze these deadly bombs into the air which must be breathed by others. Smother the cough and sneeze with a handkerchief.

The managers of this theater have agreed to see to it that any one who disobeys this order is expelled from this theater. You should get the habit at once of smothering your cough and sneeze. It is just as vital that you do this in your home, in your place of business, or in the restaurant where you eat, as it is here.

Don't forget that you need nine hours' sleep to make sure of keeping your vital forces in condition to ward off influenza and pneumonia.

Chicago is winning her fight against influenza and pneumonia, and it is up to you, Mr. Citizen, to continue the fight and stamp it out entirely.

Respectfully,

(Signed) JOHN DILL ROBERTSON,

Commissioner of Health.



